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SUBCLINICAL MITRAL DISEASE

CHAIRMAN'S ADDRESS

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BOSTON

Mitral stenosis is almost invariably acquired and is practically always the result of rheumatic fever. It is most frequently found between the ages of 15 and 40 and is more common in females than males by a ratio of three to two.

Mitral insufficiency may be either organic or relative. Relative mitral insufficiency is secondary to dilatation of the left ventricle, which may occur from a number of causes. Organic mitral insufficiency is also almost always the direct result of rheumatic fever. The former is of more serious import as it usually occurs in a dilated heart. Organic mitral insufficiency may exist for years without impairing the efficiency of the heart but often is followed by mitral stenosis or subacute bacterial endocarditis. Although mitral insufficiency may persist alone for many years, very commonly the signs of insufficiency disappear, stenosis develops or the patient may succumb to subacute bacterial endocarditis, in all too frequent eventuality.

From a study of the pathologic physiology consequent on mitral stenosis or mitral insufficiency it is evident that dilatation of the left auricle will almost invariably ensue in both conditions. It is reasonable to conclude, therefore, that careful roentgen study could be of help in the diagnosis of mitral disease by demonstrating the dilated left auricle. If mitral stenosis alone is present there will be no enlargement of the left ventricle. If, as much more frequently occurs, the stenosis is associated with mitral insufficiency, there will also be enlargement of the left ventricle.

The diagnosis of mitral stenosis can be made by several different methods, particularly auscultation, roentgen examination and electrocardiography. Other signs may suggest the presence of the condition or may contribute to the diagnosis but are rarely pathognomonic. The most widely used and the most accurate method is careful auscultation. In the early stages of the process the trained ear will hear a snapping first sound, which suggests the diagnosis, and a short pre-systolic or middiastolic rumbling murmur which is practically pathognomonic. It may be necessary to have the patient go through a short period of vigorous exercise to bring out the characteristic late diastolic rumble or it may be heard only when the patient is lying on the left side. In this stage it may easily be overlooked. In more advanced degrees of mitral stenosis the murmur may fill all of diastole and is more easily heard. Usually, of course, there is an accompanying systolic murmur.

The next most important method of confirming the diagnosis is the demonstration of the dilated left auricle fluoroscopically or roentgenographically. This is second in importance only to the characteristic diastolic murmur in the opinion of Parkinson.¹

The third observation of critical importance is less frequent but may lead to the correct diagnosis in a doubtful case. This is the presence of a broad, flattened P wave in the electrocardiogram, especially if right axis deviation is also present. This should lead one to make a presumptive diagnosis of mitral stenosis even in the absence of the characteristic diastolic murmur, as in case 4.

The typical auscultatory observations may be absent or overlooked (a) in the early stages of the process, when the change in the diameter of the valve orifice is slight and the murmur absent or very faint, and (b) in the advanced stages of the process, particularly when there is heart failure. The velocity of the blood flow through the mitral valve produces the murmur, so that if there is great dilatation of the chambers the velocity may be quite slow and the murmur very faint or absent. In this type of heart the murmur may reappear as the failure disappears. This is particularly true when there is auricular fibrillation with heart failure.

In the great majority of the cases of mitral stenosis, roentgen examination will demonstrate dilatation of the left auricle. This is best seen in the right anterior oblique position and may be of sufficient degree to displace the esophagus posteriorly and sometimes to the patient's right. In the postero-anterior view the change in the cardiac contour may be less marked and less characteristic. There may be only a straightening of the normally concave "waist" of the heart on the left border, a contour not typical of mitral disease. In the more advanced cases the left contour presents the double convexity of the dilated pulmonary artery and tip of the dilated left auricle between the aortic knob and the left ventricular contour (figs. 1 and 2). Fluoroscopic examination is much more valuable in the study of heart disease than are x-ray films. The observer is better able to separate the different chambers by their alternate pulsations and can note abnormal pulsations. He may bring out changes in heart size and relations by different phases of respiration. More important still, he may select the best amount or degree of rotation to study the contours of the various chambers and vessels and may note the effect of changed contour on neighboring structures such as the esophagus. Fluoroscopy is the only reliable method of finding, locating and identifying areas of intracardiac calcification during life, a finding which may be of critical importance in the diagnosis.

The fluoroscopic examination of a patient with mitral valvular disease, therefore, should reveal: 1. A straightening or a double convexity of the midportion of the

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1. Parkinson, John: Enlargement of the Heart (Lumleian Lecture). *Lancet* 1: 1337 (June 13), 1391 (June 20) 1936.

left cardiac contour. 2. Dilatation of the left auricle posteriorly, best shown in the right anterior oblique position. The convex curve of the dilated auricle is located in the middle third of the cardiac shadow and may obscure the middle third of the posterior mediastinal space. 3. Widening of the base of the heart in the right anterior oblique view, due to the combination of enlarged pulmonary conus anteriorly and dilated left auricle posteriorly.

Fluoroscopy may also show: 4. Displacement of the barium-filled esophagus posteriorly with moderate to marked dilatation of the auricle, best shown during the expiratory phase but most reliable when also present during inspiration. 5. Dilatation of the pulmonary vessels at the lung roots due to stasis in the pulmonary circulation. These vessels do not pulsate as in Ayerza's disease and patent ductus arteriosus. They may be considerably dilated and congested without producing physical signs or symptoms. 6. Hypertrophy of the right ventricle, seen best in the exaggerated left anterior oblique view, which reveals a ledge or shoulder projecting anteriorly. 7. Narrowing of the precardiac space in the lateral view, with a greater amount of the heart in contact with the sternum than normal and (8) a hypoplastic aortic knob, in cases in which the mitral stenosis was acquired in childhood. Marked dilatation of the pulmonary artery may partly obscure the aortic knob, making it seem hypoplastic by comparison. The real hypoplasia is thought to be due to a decreased volume of blood from the left ventricle, in turn due to the mitral stenosis.

In advanced or long standing mitral valvular disease, the left auricle may be so dilated that it will displace the left bronchus upward and may even compress it. This may result in dyspnea, cough, atelectasis or obstructive emphysema of the left upper lobe. In other advanced cases the left auricle may extend far to the right and make up a part or even all of the right cardiac contour, sometimes simulating the contour seen with tricuspid insufficiency. When a double contour on the right is seen, the upper convexity will be due to the left auricle, which will lie more posteriorly than the lower one. If the tube is shifted from side to side the upper curve will be seen to move in the opposite direction more than the lower one, indicating its more posterior position. This is the principle of parallax, used in locating metallic foreign bodies. Usually there is an easily perceptible difference in pulsation, the two chambers contracting and expanding alternately. This is due to the systolic expansion of the left auricle as a result of the mitral insufficiency. A dilated descending branch of the right pulmonary artery may simulate a dilated left auricle projecting to the right and may even show a transmitted systolic pulsation immediately following the auricular contraction of the lower (right auricular) convexity. The true character of this upper curve may be recognized by watching it carefully while rotating the patient to the left, and by noting the point of origin and the other branches of the artery on the film, where it is wedge shaped, base up.

Of these signs the dilated left auricle is the only important or critical one: the others are supportive and confirmatory. Of still greater value and, in my experience, absolutely pathognomic, is the demonstration of calcified areas in the mitral valve. Calcification in the injured mitral valve is found in the majority of cases at autopsy but is unfortunately not visible fluoroscopically in more than 10 per cent of the patients during life. This is in striking contrast to aortic stenosis,

in which the majority will have deposits of calcium large enough to be readily demonstrable under the fluoroscope.²

These diagnostically important intracardiac deposits of calcification are easy to find and easy to differentiate if a few simple rules are followed. They are most easily located fluoroscopically. The observer's eyes must be thoroughly prepared by at least fifteen minutes in a completely darkened room. A radiolite wrist watch or a Pirie photometer can be used to test accommodation for night vision. With the eyes properly accommodated, the usual screen examination is carried out and then the observer narrows the fluoroscopic aperture to a few square centimeters and looks through the heart, searching for dark dancing shadows. The intracardiac calcium deposits all show a to and fro movement with systole and diastole, and those in the valves may have an excursion of 2 or 3 centimeters, sometimes in an elliptic or triangular course. The calcified aortic and mitral valves are found under a line along the auriculoventricular sulcus, which is usually about 45 degrees from the horizontal. The auriculoventricular junction is easily identified on the left border. The patient should be rotated slightly to the left, so that the calcified areas will not be hidden by the spine. The patient should take a deep inspiration and hold it, so that the underlying pulmonary markings will be immobile and not confusing. This also helps by intensifying the contrast due to the distention of the lung. If the heart has the "mitral" configuration, the calcified areas are nearer the apex than with the "aortic" configuration, where they are found nearer the base. This is due to the dominance of the dilated auricles in the first type of heart and of the hypertrophied ventricle in the "aortic" type. If a calcified valve is found a fairly accurate guess can be made as to which valve is calcified by considering the shape of the heart. A more reliable and more accurate means of differentiating between the calcified aortic and mitral valves is to rotate the patient to the opposite side (left anterior oblique), where the mitral valve will be found to be in the posterior third of the heart shadow, while the aortic valve will be found in the middle third. The pulmonic and tricuspid valves are very rarely calcified and do not enter into the differential diagnosis as a rule. A frequent source of error, however, is calcification of the mitral annulus fibrosus. This is frequently quite massive and is the most easily demonstrable of the three. However, the calcified annulus is usually either U shaped or J shaped or O shaped, and it is more homogeneous than the irregular mulberry-like calcification in the valves themselves. Its movements are similar to those of the calcified mitral valve but its clinical significance is nil. It occurs only as a senile change, usually in persons over 60 years of age, and is often associated with arcus senilis and calcification of the intervertebral disks. There is no dilatation of the left auricle with calcification of this ring, as the mitral valve is not involved and its function is not affected.

The other intracardiac calcifications are not ordinarily confused with calcification in the valves. Calcification large enough in amount to be visible fluoroscopically has been found in (a) the coronary arteries,³ (b) the pericardium, (c) the myocardium, such as calcified infarcts, (d) the endocardium, particularly of the auri-

2. Sosman, M. C.: *Röntgenological Aspects of Acquired Valvular Heart Disease*, *Am. J. Roentgenol.* **12**: 47-56 (July) 1939.
3. Wosika, P. H., and Sosman, M. C.: *The Roentgen Demonstration of Calcified Coronary Arteries in Living Subjects*, *J. A. M. A.* **102**: 591 (Feb. 24) 1934.

cles, and (e) rarely in one of the benign tumors. The latter has not yet been found during life; the others have all been noted during life and subsequently confirmed at autopsy.

There is no special apparatus required to demonstrate these calcified valves, just the regular fluoroscope with a 5 inch gap, 5 milliamperes of current, a small fluoroscopic aperture and a screen of fine grain and high intensity like the type B fluoroscopic screen. The sensitization of the eyes for fifteen minutes is probably the most important step in the procedure.

If one finds, therefore, a dilated left auricle and calcification in the mitral valve, one can make an unequivocal diagnosis of mitral stenosis. The presence of calcification in the mitral valve indicates in my opinion the rheumatic etiology, as I have not found this degree of calcification in the mitral valve to be due to either syphilitic or atherosclerotic processes. I feel that this is true also in the majority of cases of aortic stenosis with calcification. If the appearances are those of a dilated left auricle with the collateral observations already noted and without demonstrable calcification of the mitral valve, the diagnosis of mitral stenosis is highly presumptive, even in the absence of other physical signs.

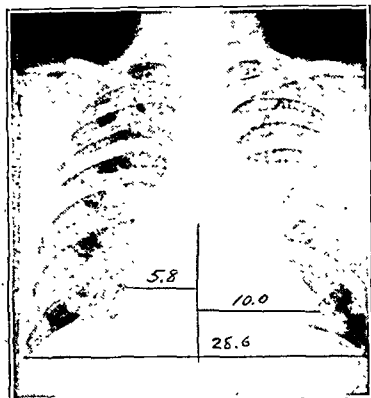


Fig. 1 (case 1).—Seven foot film of the heart showing general cardiac enlargement and the fulness in the middle third of the left cardiac contour very suggestive of mitral disease.



Fig. 2 (case 1).—Right anterior oblique film showing marked dilatation of the left auricle posteriorly, displacing the esophagus in a characteristic concavity, highly suggestive of mitral stenosis.

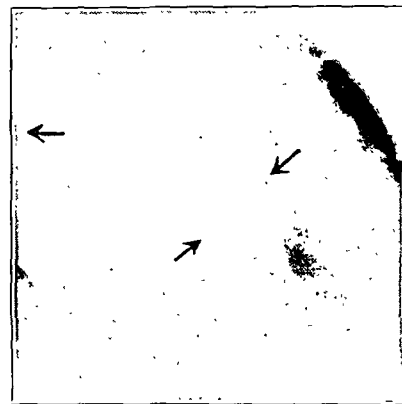


Fig. 3 (case 1).—Spot film taken at 30 inch distance, 200 milliamperes, one twentieth second, showing an irregular mass of calcification in the mitral valve (arrows), unequivocal evidence of mitral stenosis, and posterior displacement of esophagus (single arrow).

For many years my associates and I have regularly made a fluoroscopic examination of all patients sent to us for examination of the heart and nearly all of those sent for chest examination. In addition we make a fluoroscopic examination of the chest in all gastrointestinal examinations.

During this time, but more particularly since 1935 when we found an unsuspected mitral stenosis in one of our technical staff, we have recorded for purposes of "clinically undiagnosed cases of mitral mitral disease." This is admittedly an erroneous and etymologically incorrect label. If strictly interpreted it could mean "mitral disease under the bed." What we do mean, I think, is amply explained by the preceding discussion, that is, patients with mitral disease whose condition was clinically undiagnosed before roentgen examination. We soon found that such patients could be grouped or classified in several subdivisions. For our own purposes of record we have termed them class A, B and C. The class A group is a small one. These patients have unequivocal roentgen signs of mitral disease, but the clinical observations are either absent or inconclusive. The diagnosis could not be made at the time of exami-

nation without the roentgen signs. Cases 1 and 2 reported herewith are typical examples of this group.

Class B is the largest group and includes the patients with undoubted mitral disease in whom the physical signs of the disease were overlooked by one or more competent physicians before the roentgen examination. The appearances by fluoroscopic and film examinations were quite definite, and careful study by our cardiologist, Dr. S. A. Levine, brought out the definite signs of mitral disease and confirmed the diagnosis. The diagnosis could have been made by the cardiologist without the roentgen examination. A third group, class C, includes those patients with the roentgen findings compatible with mitral disease but not characteristic of it and with no clinical or other observations to corroborate the diagnosis. Patients in this group are being followed to see if they subsequently develop typical clinical signs of mitral disease or other conditions to explain the abnormal roentgen appearances. No doubt we should add a fourth group, class D, to include those patients in whom the clinical signs of mitral disease are quite definite but the roentgen appearances are either inconclusive or negative. This group is quite small. Roesler⁴ says that dense mediastinal

adhesions may account for the lack of dilatation of the left auricle in those cases.

The list of conditions which may cause dilatation of the left auricle and thus simulate mitral disease is usually given as follows: Thyrotoxicosis, emphysema, pneumoconiosis, fibrosis of the left upper lobe, beriberi, congenital heart disease, especially patency of the ductus arteriosus and pulmonic stenosis, scoliosis of the spine to the right, and pleuropericardial adhesions. Tumors in the auricle close to the valve could of course cause mechanical stenosis of the valve and might in time give rise to the usual roentgen configuration of mitral disease.⁵ In my experience most of the foregoing conditions either fail to simulate the appearance of mitral disease or do so only but rarely, particularly emphysema, pneumoconiosis, pulmonary fibrosis, scoliosis and extra-pericardial adhesions. As to the others, thyrotoxicosis in my experience rarely causes changes in cardiac contour which would simulate mitral disease except in failing hearts with auricular fibrillation. Patent ductus

4. Roesler, Hugo: Clinical Roentgenology of the Cardiovascular System, Springfield, Ill., Charles C. Thomas, 1937, p. 193.

5. Wainwright, C. W.: Intracardiac Tumor Producing the Signs of Valvular Heart Disease, Bull. Johns Hopkins Hosp. 63: 187-200 (Sept.) 1938.

arteriosus can and does simulate mitral disease roentgenographically and may cause dilatation of the left auricle as is reported by Eppinger and Burwell⁶ in this symposium. Similarly it may give the clinical signs and murmurs of mitral disease, as occurred in one of the cases included in the report by Dr. Gross.⁷ The most frequent cause of error in the diagnosis of mitral disease in our series is in heart failure from any cause, particularly with cardiac dilatation and auricular fibrillation. The dilated left auricle seen in these conditions may actually be due to relative mitral regurgitation or to stasis in the atonic fibrillating auricle. Sussman and Woodruff⁸ have shown that fibrillation of the auricles is rarely followed by dilatation of the auricles unless complicated by valvular disease. As a matter of actual practice in fluoroscopic examination we rarely see patients with the degree of cardiac failure just noted, and those with thyrotoxicosis can usually be differentiated by the hyperactivity of the heart and by the absence of the normal sinus arrhythmia. Moderate degrees of left auricular dilatation may be present in ambulatory patients with heart failure due to nonvalvular lesions such as beriberi, anemia or nephritis, but in general I agree with Parkinson¹ that definite dilatation of the

of mitral stenosis as there would be in the early diagnosis of cancer or of pulmonary tuberculosis. The treatment would not be any different nor would it presumably have any different effect. The value of such studies must lie therefore in the difference in prognosis, with a possible change in our ideas as to the latent or inactive period in potential heart disease—that period between the first infection with rheumatic fever and the onset of symptoms or the discovery of physical signs of acquired valvular heart disease. The difficult differential diagnosis in this stage is between no heart disease at all with a normal prognosis and acquired mitral valvular disease, which is of quite serious import and which automatically carries with it a bad prognosis as to length of life.

REPORT OF CASES

CASE 1.—D. G., an Italian laborer aged 38, was first seen in the medical outdoor department of the Peter Bent Brigham Hospital on Oct. 7, 1938, complaining of shortness of breath on exertion for about one year, and epigastric pain, thought to be due to peptic ulcer. He was accordingly referred to us for gastrointestinal examination and during the routine fluoroscopy of his chest an enlarged heart of mitral configuration was noted (figs. 1 and 2). On looking through the heart with the fluoro-

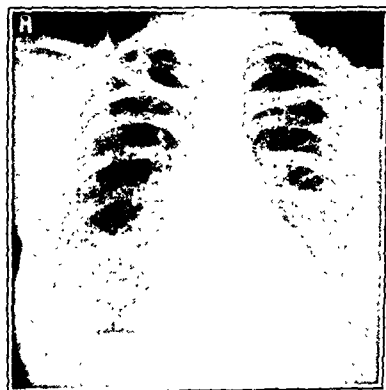


Fig. 4 (case 2).—Seven foot film of the heart showing general cardiac enlargement and the double convexity in the middle third of the left cardiac contour suggesting mitral stenosis.



Fig. 5 (case 2).—Right anterior oblique film showing marked dilatation of the left auricle (arrows) projecting beyond the anterior border of the spine.

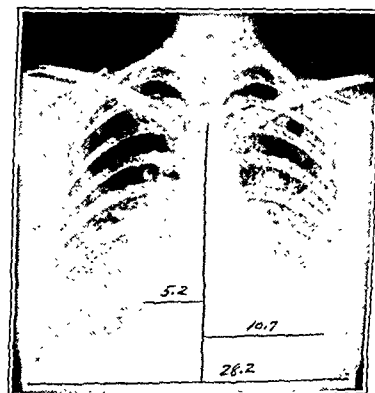


Fig. 6 (case 3).—Seven foot film of the heart showing slight cardiac enlargement, a straight left border without convexities, and fairly marked dilatation of the pulmonary vessels. Patient was symptomless at time.

left auricle is one of the most certain signs of mitral stenosis, and this is particularly true in the absence of heart failure.

The accuracy of our clinical diagnoses in acquired valvular heart disease is quite high, particularly in the hands of trained cardiologists, but most of these patients are in advanced stages of the disease and many are soon confirmed at autopsy. Our accuracy in the early stages of the disease is open to question, as there is often a long latent period between a given attack of rheumatic fever and the discovery of mitral stenosis. The process must inevitably have been present and gradually progressing during the latent period when no murmurs, or only a systolic murmur, were present. Mitral stenosis does not appear suddenly; it is a slow gradual process. It is quite possible, therefore, that the routine use of the fluoroscope by a trained observer may be of aid in the earlier diagnosis of mitral stenosis. There is little of therapeutic value in the earlier diagnosis

scope, we found a calcified area in the region of the mitral valve (fig. 3) with the characteristic dancing movements during the cardiac cycle. The left auricle was dilated posteriorly and there was bilateral pulmonary congestion. Neither at that time nor subsequently in the cardiac clinic were physical signs of mitral stenosis heard, but Dr. Levine concurred in the diagnosis after seeing the x-rays and the report of fluoroscopy.

No history of rheumatic fever could be elicited, but he had suffered from frequent nosebleeds as a child—one of the stigmas commonly associated with rheumatic fever. The patient was studied thoroughly in the medical ward from Sept. 14 to Sept. 27, 1939, and again no definite diagnosis of mitral stenosis could be made except by roentgen examination.

Additional observations in the ward were noncontributory and are given here only for the sake of completeness. The urine was normal with a specific gravity varying from 1.012 to 1.016; no sugar or albumin was found. Blood examination showed hemoglobin 105 per cent, red blood cells 5,220,000, white blood cells 9,100, polymorphonuclears 75 per cent, hematocrit 42 per cent. The serologic reaction was negative. The phenol-sulfonphthalein excretion was 70 per cent in two hours. Gastric analysis revealed hyperacidity. The spinal fluid was normal, including the colloidal gold curve, protein determinations and manometric readings. The icteric index was 5. The vital capacity was 2,300 cc. The basal metabolic rate was —8 per cent. The sedimentation rate was 30 mm. an hour. The venous pressure was 65 mm. of water. The circulation time (decholin

6. Eppinger, E. C., and Burwell, C. S.: The Mechanical Effects of Patent Ductus Arteriosus on the Heart and Their Relation to the X-Ray Signs, J. A. M. A., to be published.

7. Gross, R. E.: Experiences with Surgical Treatment in Ten Cases of Patent Ductus Arteriosus, J. A. M. A., to be published.

8. Sussman, M. L., and Woodruff, M. T.: Significance of Left Auricular Dilatation in Auricular Fibrillation, Am. J. Roentgenol. 40: 184-188 (Aug.) 1938.

method) was 18 seconds. An electrocardiogram showed normal curves. Scratch sensitivity tests showed increased sensitivity to several materials. A gastrointestinal series was normal. Cholecystograms were normal. Dr. Romano, on analyzing the patient, found a rather profound psychoneurosis.

The patient has been seen several times since his discharge from the hospital, his condition essentially unchanged, with no definite signs or symptoms of cardiac disability except for the occasional paroxysmal and nocturnal attacks of dyspnea, which were thought not to be of cardiac origin. There was no improvement in his condition nor has there been any worsening. The last note on his record is the rather cryptic one that in the spring of this year (1940) he had borrowed \$300 and returned to Italy, leaving his wife and children in Boston.

CASE 2.—R. D., a married woman aged 37, Jewish, was admitted to the hospital Jan. 11, 1936, because of pain in the right leg of three days' duration. Physical examination revealed an enlarged heart, with auricular fibrillation but no significant murmurs. Dr. Levine felt that she had an enlarged heart with auricular fibrillation and thought that she might have mitral valvular disease because of the presumed embolus to the right femoral artery and other episodes suggesting peripheral emboli. Roentgen examination (figs. 4 and 5) confirmed the suspicion of mitral stenosis, revealing fairly marked cardiac enlargement both to the right and to the left, with marked dilatation of the left auricle obscuring the posterior mediastinal space and displacing the esophagus backward and to the right. Pulmonary congestion was also present. No calcification of the mitral valve could be demonstrated but the diagnosis of mitral stenosis appeared to be quite definite without it. Dr. Levine stated that he could only suspect the presence of a mitral stenosis in the absence of the characteristic murmur, but with the roentgen observations the diagnosis seemed quite certain.

The patient's response to therapy was not satisfactory and she died in June 1936, presumably from a pulmonary infarction. Unfortunately an autopsy was not obtained.

These two patients are both listed in our records as class A: ones in whom the diagnosis of mitral stenosis could not be made without the roentgen examination. There are others in the same group, each presenting a particular problem of his own, but none any less definite than case 2 or more positive than case 1, in which we feel that the diagnosis of mitral stenosis is unequivocal in spite of absence of clinical signs and symptoms.

There are many more patients listed in class B but a detailed presentation of their vital statistics would be of no particular value to the informed reader. It is common knowledge that a particular diagnosis can be made more easily and more accurately by the man who

As one example typical of the whole group of class B patients I cite case 3:

CASE 3.—H. R., an unmarried woman aged 36, a nurse technician, complained of ease of fatigue, loss of weight, shortness of breath on exertion and troublesome cough at times. Fearing pulmonary tuberculosis, she asked for an x-ray examination of her chest. We found (fig. 6) no evidence of primary pulmonary disease but we did note considerable pulmonary congestion chiefly around the hili and an abnormal contour of the heart shadow, with straightening of the left border, slight cardiac enlargement and definite dilatation of the left auricle posteriorly. No calcification of the mitral valve could be demonstrated, but we felt that the diagnosis of mitral stenosis was highly presumptive.

A study of her past history revealed chorea at the age of 18, scarlet fever at the age of 19 and frequent attacks of tonsillitis during the past twelve years. She had been seen by several competent physicians in the past few years but they had not made the diagnosis of mitral stenosis. Dr. Levine, however, was able to detect the faint diastolic murmur characteristic of the disease and made the diagnosis without reservation. The patient had intermittent but progressive symptoms of cardiac failure during the succeeding three years and died in cardiac decompensation July 26, 1938. During her periods of decompensation the diastolic murmur would decrease in intensity and sometimes disappear.

CASE 4.—J. S. B., a man aged 33, was admitted to the hospital Jan. 16, 1940, in heart failure. There was no past history of rheumatic fever, but he had been told that he had heart murmur in childhood. He had suffered from shortness of breath for four years and had a series of small hemoptyses three years before admission. Following appendectomy one year before admission there were migratory joint pains which were considered to be due to rheumatic fever. Dr. Levine has seen the patient four years before, at which time he found a systolic murmur only, but he made a presumptive diagnosis of mitral stenosis because of the electrocardiographic tracings, which showed a broadened flattened P wave (fig. 7).

Physical examination on admission showed him to be in heart failure, fibrillating, with rales at both bases, fluid at the right base, moderate venous engorgement, slight pitting edema of the lower extremities and a markedly enlarged tender liver. The first sound at the apex was snapping in character; there was a grade 3 systolic murmur but no diastolic murmur could be heard.

X-ray examination (fig. 8) revealed marked cardiac enlargement, with marked dilatation of the left auricle, dilatation of the pulmonary vessels and moderate enlargement of the right ventricle and right auricle. Fluoroscopy showed a large mass of calcification in the region of the mitral valve. Our interpretation was "combined valvular heart disease, primarily mitral, with calcification of the mitral valve."

The patient did not respond well to therapeutic attempts and died the day following admission. Autopsy was refused.

COMMENT

Cases 3 and 4 are examples of mitral stenosis in which the diagnosis can be materially aided by x-ray examination. In case 3 the presumptive diagnosis was pulmonary tuberculosis but the correct diagnosis could

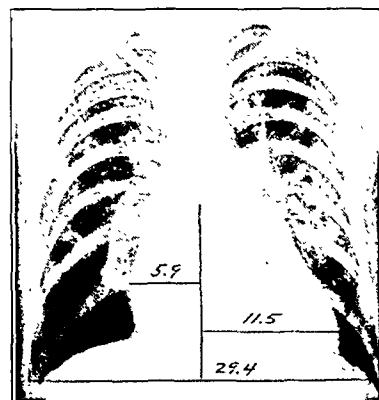


Fig. 8 (case 4).—Seven foot film of the heart showing marked cardiac enlargement both to the right and to the left, a double convexity on the left border and dilatation of the pulmonary vessels, suggesting combined valvular heart disease, primarily mitral.

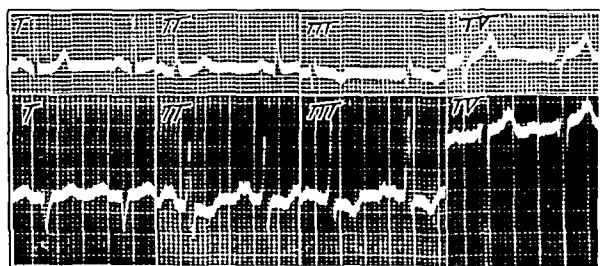


Fig. 7 (case 4).—Upper curves show electrocardiograms of a normal patient. Lower set clearly indicates mitral stenosis. Note prominent broad topped and notched P waves (lead 2) and right axis deviation.

has the most interest and the most experience in that field. There is no doubt that many cases of mitral stenosis are overlooked in their earlier stages; in fact there must be a stage in most of the cases in which the condition is still latent and the diagnosis cannot be made by any means. We can only speculate at present as to whether or not the left auricle is already beginning to dilate when the diastolic murmur first becomes audible. Additional work is being done along these lines.

have been made by a competent cardiologist. It was easily made by fluoroscopic examination. In case 4 the electrocardiogram gave the first hint as to the correct diagnosis, and again it was easily verified by fluoroscopic examination. It could have been made (and was in case 3) by x-ray examination independent of the history and physical examination. It could have been suspected from her constitutional type, as she was of Irish descent, with red hair, a fair complexion and many freckles. There had been a previously unexplained moderate hypochromic anemia for years, variable in degree, and intermittent menorrhagia, all frequent concomitants of rheumatic heart disease in New England.

SUMMARY AND CONCLUSIONS

Mitral stenosis can be diagnosed in a high percentage of cases by careful roentgen examination, including fluoroscopy.

The demonstration of a calcified mitral valve is unequivocal evidence of mitral stenosis and also indicates its rheumatic etiology.

Dilatation of the left auricle without general cardiac enlargement is highly presumptive evidence of mitral stenosis.

The diagnosis of mitral stenosis can at times be made by roentgen examination even in the absence of characteristic physical signs—here called "subclinical mitral disease."

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PROGNOSIS IN CARCINOMA OF THE RECTUM

A COMPARISON OF THE BRODERS AND DUKES METHODS OF CLASSIFICATION

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In recent years a signal advance has been made in determining the operability of malignant lesions of the rectum and sigmoid, and methods have been evolved by which it is now possible to determine with fair accuracy the probable length of life of individuals following removal of such lesions. Operability can be determined by proctoscopic examination, digital examination of the terminal portion of the colon and bimanual examination of the pelvis. Much of prognostic significance may be learned by such methods, but little can be determined in this manner concerning length of life following radical removal of carcinoma.

A valuable single criterion by which the surgeon can usually decide, before operation, the probable length of life of a patient following radical extirpation of malignant lesions has been provided by one of us,¹ namely the numerical microscopic grading of such tumors. By using such a method the surgeon or pathologist is able to recognize certain cellular changes which are of sig-

nificance in determining operability, mortality and the probable period of survival following operation. The earliest study was made in 1920 on a series of 537 patients suffering from epithelioma of the lip. It was then that four grades of malignancy were described, but in 1925 this method of grading was altered so that grade 1 included those lesions in which from nearly 100 to 75 per cent of the cells are differentiated, grade 2 from 75 to 50 per cent, grade 3 from 50 to 25 per cent, and grade 4 from 25 to 0 per cent. The grading of carcinoma on a basis of cellular differentiation is a natural application of the general biologic principle that, as a cell becomes differentiated or specialized, its power to reproduce is decreased. One of us² said that "a carcinoma whose cells increase in geometric progression without differentiation beyond the point of reproduction would grow faster and be more malignant than one that caused a number of cells to differentiate beyond the point of reproduction."

The high power photomicrographs in figures 1 and 2 show the relative proportion of differentiated and undifferentiated cells in grades 1, 2, 3 and 4.

In grade 1 carcinomas the cells are columnar; the nuclei are not prominent and are smaller than in grade 2. They approach closely the appearance of normal mucous membrane. The low power arrangements of cells in the two grades may closely resemble each other.

In grade 2 the cells are less columnar and the nucleus forms a more prominent part of the cell. The nucleoli are relatively larger, and well formed acini are nearly always present.

In grade 3 the cells are larger and definitely round, and the nucleus takes up nearly all of the cell. Acini may be present but are usually poorly formed. The low power arrangement of cells may closely resemble that of grade 2, but when the majority of cells are large and rounded and the nuclei are nearly as large as the cell, the carcinoma should be graded 3.

In general, the cells in grade 4 lesions tend to be large, hyperchromatic and round and have dedifferentiated so far that they bear little resemblance to the cells of the colonic mucous membrane. Both the low power and the high power views reveal definite characteristics, and there is less chance of error in a consideration of these cells than in the cells of a grade 2 carcinoma. MacCarty³ has discussed the cytologic aspect of the carcinoma cell, and he stressed the volume relationship between the nucleolus, the nucleus and the whole cell in reparative regenerative cells and in malignant regenerative cells. He found that the nucleolar-nuclear area ratio varies from approximately 1:23 in malignant cells to 1:50 or more in reparative regenerative cells.

In 1926 Lockhart-Mummery⁴ adopted a method of classifying carcinoma of the rectum based on clinical and pathologic factors. He arranged his cases in three groups, as follows: class A, small movable lesions which did not appear to involve the muscular coat or the lymph nodes; class B, lesions which appeared to involve the muscular coat but were not fixed and the lymphatic involvement of which was not extensive, and class C, large growths which were fixed and in which there was evidence of extensive lymphatic involvement.

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Abridgment of thesis submitted by Dr. Laird to the Faculty of the Graduate School of the University of Minnesota in partial fulfillment of requirements for the degree of Master of Science in Proctology.

1. Broders, A. C.: Squamous-Cell Epithelioma of the Lip: A Study of Five Hundred and Thirty-Seven Cases, *J. A. M. A.* **74**: 656-664 (March 6) 1920; *Cancer's Selfcontrol*, *M. J. & Rec.* **121**: 133-135 (Feb. 4) 1925.

2. Broders, A. C.: The Grading of Carcinoma, *Minnesota Med.* **8**: 726-730 (Dec.) 1925.

3. MacCarty, W. C.: Microscopic Grading of Tumors: Its Interpretation, Limitations, and Relation to Radiosensitivity, *Am. J. Roentgenol.* **37**: 365-367 (March) 1937; A Cytologic Key to the Diagnosis and Prognosis of Neoplasms, *J. Lab. & Clin. Med.* **13**: 354-365 (Jan.) 1928.

4. Lockhart-Mummery, J. P.: Two Hundred Cases of Cancer of the Rectum Treated by Perineal Excision, *Brit. J. Surg.* **14**: 110-124 (July) 1926.

Dukes⁵ modified this arrangement so that in class A he included lesions which were definitely limited to the wall of the rectum without extrarectal extension or metastasis to lymph nodes. In class B he placed growths which had spread by direct extension to extrarectal tissues but had not invaded the lymph nodes. He considered all carcinomas in which metastasis was present in the regional lymph nodes to be in class C.

In 1933 Wood and Wilkie⁶ studied 100 resected specimens of carcinoma of the rectum, classified them according to the Dukes method and divided them histologically into four grades. Their method of histologic gradation was not that of Broders but was modified in that the grading was done on the low power arrangement of cells instead of the degree of differentiation of cells. They believed that the early stage of carcinoma is represented by a flattened plaque in the mucous membrane and that the least malignant tumors tend to grow toward the lumen and take on a papilliferous appearance. High grade tumors with deeply penetrating tendencies remain flat or have only moderately elevated margins. W. W. Mayo⁷ expressed the same opinion many years ago. Mucoid carcinomas with signet ring cells were believed to be the most malignant.

TABLE 1.—Comparison of Five Year Survival Rates According to Class of Lesion (Lockhart-Mummery, Dukes) in Five Different Investigations

Class of Patients	Gabriel, Dukes and Bussey 1935	Dukes 1936	Gordon-Watson 1938	Lockhart-Mummery 1938	Broders, Buie and Laird 1938
Number of patients surviving and traced	100	142	88	289	354
Percentage of patients alive 5 years after resection:					
Class A.....	83.3	86.6	82.7	66.3	79.2
Class B.....	54.5	56.0	55.2	46.8	39.0
Class C.....	14.3	20.9	13.3	25.4	18.7

In 1935 Gabriel, Dukes and Bussey⁸ made a study of thirty perineal and seventy perineo-abdominal excisions and grouped them according to the Dukes method of classification. They stretched the resected specimen on a frame and fixed it in 10 per cent solution of formaldehyde. All lymph nodes were measured, located on a drawing of the resected specimen, cut and examined histologically.

Gordon-Watson⁹ in 1938 divided eighty-eight specimens of carcinoma removed by perineal excision into classes according to the method of Dukes⁵ and reported the number of years each patient in the series had lived. In 1938 Lockhart-Mummery¹⁰ published the results of his personal experience with 388 patients treated by perineal excision and recorded the grades of growth according to the Dukes method, the immediate operative result and the length of life of each patient. In each of the aforementioned investigations the percentage of five year survivals, based on the patients who survived operation and were traced, was determined for each class, and these are shown in table 1.

A study of the work and the conclusions of these investigators prompted the present investigation. It was felt that by taking new specimens from resected growths and studying them according to both the Broders and the Dukes method a comparative study might bring forth interesting inferences and establish substantial conclusions. Accordingly, the records of all patients treated for carcinoma of the rectum and rectosigmoid at the Mayo Clinic during the years 1920, 1921, 1929 and 1930 were collected, and since only those instances in which radical resection of the tumor was performed would serve our purpose, all other records were deleted. Thus 432 records were found to fit all requirements. In addition, 250 cases, making a total



Fig. 1.—Section of a grade 1 carcinoma of the rectum (a); the cells are columnar; the nuclei are not prominent and are smaller than those in grade 2 lesions. They approach closely the appearance of normal mucous membrane (hematoxylin and eosin stain; slightly reduced from a photomicrograph with a magnification of 400 diameters). Section of a grade 2 carcinoma of the rectum (b); the cells are less columnar and the nuclei form a more prominent part of the cell. The nucleoli are relatively larger and are well formed; acini are often present (hematoxylin and eosin stain; slightly reduced from a photomicrograph with a magnification of 400 diameters).

of 682, in which only colostomy or exploration was performed were included for the study of auxiliary problems. A suitable follow-up procedure was established in order to gather information regarding the length of life of the patient following the operation.

Second, all pathologic specimens removed at operation were reexamined. A longitudinal incision was made, exposing the mucosal surface of the bowel, so that the conformation of the lesion would be disturbed as little as possible. A sketch was made to actual size of the plane surface of the lesion and the portion of ulcera-

5. Dukes, Cuthbert: The Classification of Cancer of the Rectum, *J. Path. & Bact.* 35: 323-332 (May) 1932.

6. Wood, W. Q., and Wilkie, D. P. D.: Carcinoma of the Rectum: An Anatomico-Pathological Study, *Edinburgh M. J.* 40: 321-343 (July) 1933.

7. Mayo, W. W.: Personal communication to W. J. Mayo and from him to A. C. Broders.

8. Gabriel, W. B.; Dukes, Cuthbert, and Bussey, H. J. R.: Lymphatic Spread in Cancer of the Rectum, *Brit. J. Surg.* 23: 395-413 (Oct.) 1935.

9. Gordon-Watson, Charles: Origin and Spread of Cancer of the Rectum, in Relation to Surgical Treatment, *Lancet* 1: 239-245 (Jan. 29) 1938.

10. Lockhart-Mummery, J. P.: The Treatment of Cancer of the Rectum, *Surg., Gynec. & Obst.* 66: 527-533 (Feb.) 1938.

tion. The position of the lesion was established by measuring and recording its distance above the external anal margin. Approximately every three sixteenths of an inch (5 mm.) for the full length of the specimen, incisions were carried transversely to the long axis of

scopically. Usually the first impression as to the degree of extension was unchanged by microscopic examination. One growth thought to be class B on gross inspection was changed to class A after microscopic examination (fig. 6). The blocks of tissue, identified by the patient's number, were frozen, sectioned and stained with hematoxylin and eosin. Some blocks of tissue from specimens obtained in 1920 and 1921 were immersed in a 3 per cent solution of ammonium hydroxide for twelve hours and were then replaced in 10 per cent solution of formaldehyde in order to improve staining qualities.

TABLE 2.—Distribution According to Histologic Grade of Malignancy (Broders) in 682 Cases, Comprising the Total Series Examined

Type of Surgical Treatment	Total Patients	Grade of Malignancy							
		1		2		3		4	
		Pa-tients	Per Cent	Pa-tients	Per Cent	Pa-tients	Per Cent	Pa-tients	Per Cent
Colostomy or exploration only.....	250	50	20.0	129	51.6	50	20.0	21	8.4
Some form of resection.....	432	73	16.9	241	55.8	100	23.1	18	4.2
Total.....	682	123	18.0	370	54.2	150	22.0	39	5.7



Fig. 2.—Section of a grade 3 carcinoma of the rectum (a); the cells are larger and definitely round, and the nucleus occupies nearly all of the cell; acini, when present, are usually poorly formed (hematoxylin and eosin stain; slightly reduced from a photomicrograph with a magnification of 400 diameters). Section of a grade 4 carcinoma of the rectum b; the cells are usually large, hyperchromatic and round; they bear little resemblance to the cells of the mucous membrane of the colon (hematoxylin and eosin stain; slightly reduced from a photomicrograph with a magnification of 400 diameters).

the bowel from the serosal to the mucosal surface. By this means the thin slices hinged on the uncut mucous membrane, facilitating examination of lymph nodes (fig. 3). A sketch of a section of the specimen was made to show the depth of ulceration and the degree of penetration of the wall of the bowel by the carcinoma. Lymph nodes were frozen, sectioned and stained with Terry's neutral polychrome methylene blue. Those nodes that were seen to be free from metastasis were represented in the sketch by clear circles, and those that were involved were indicated by filled in circles. If one lymph node was found to contain metastasis, no further nodes were examined microscopically. One or more blocks of tissue were taken at the points of deepest penetration of the carcinoma, and their relative positions were indicated on the sketches. Photographs of the gross specimens in classes A, B and C are shown in figures 4 and 5. The Dukes classification of the growth was recorded. In a few instances, classification was deferred until the block could be examined micro-

scopically. Third, the sections were studied microscopically by the method of Broders and the grade was recorded on each slide. According to the Dukes method, the drawings were examined, verified histologically and recorded on the slide. This information, with the sketch, was then added to a card on which the other pertinent data had been previously recorded. In this way the grading was established without knowledge of any other facts in the case.

In a few instances, involvement of lymph nodes found on the first examination was not found on reexamination. When this occurred the original report was accepted.

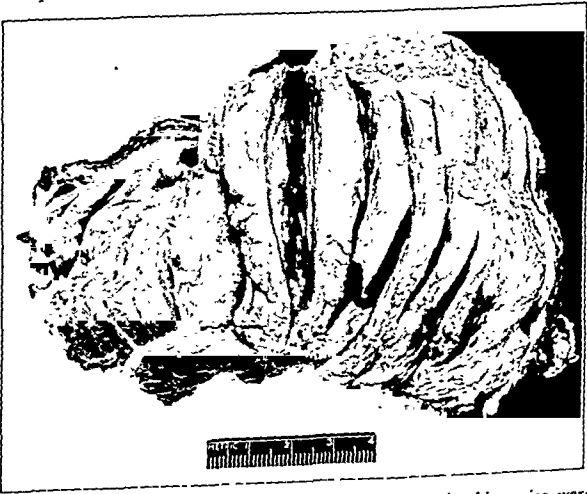


Fig. 3.—Illustrating the manner in which specimens in this series were cut for examination of lymph nodes.

DISTRIBUTION BY GRADE

Table 2 shows the distribution according to Broders' gradation in 682 cases in which surgical treatment had been administered. Table 3 compares the grading by different authors in resected growths. Close agreement is apparent and indicates that, if the Broders method is followed carefully, results should be consistent. The reason for the difference between the series of Broders

and the present series may be understood by comparing the distribution of grade 4 in 1920 and 1921 with grade 4 in 1929 and 1930. It should be remembered also that this is a comparison of grades of resected specimens and not of distribution in general. In 1920

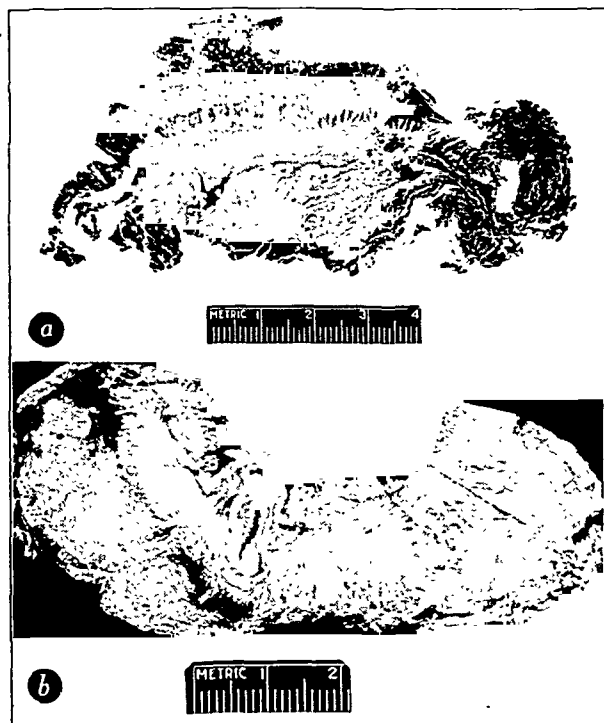


Fig. 4.—Carcinoma of the rectum (a), class A, grade 4; the carcinoma apparently did not penetrate the musculature of the rectum at any point; carcinoma of the rectum (b), class B, grade 2; the carcinoma has penetrated the musculature in several places.

and 1921 grade 4 represented 7.2 per cent of 152 resected specimens, and in 1929 and 1930 only 2.5 per cent of 280 specimens were classified in this group. This difference was the result of the fact that in 1929

TABLE 3.—*Percental Distribution of Grades of Malignancy—2,210 Resected Neoplasms Reported in Four Investigations*

Series	Total Cases Reported	Percentage in				Col- loid
		Grade of Malignancy				
		1	2	3	4	
Broders, Buie and Laird	432	16.9	55.8	23.1	4.2	
Rankin and Broders.....	598	17.6	50.0	23.5	8.9	
Broders.....	580	14.6	51.8	24.5	9.1	
Dukes.....	600	6.0	54.0	26.0	2.0	12.0

and 1930 some surgeons did not favor the surgical removal of grade 4 lesions because of the unfavorable outlook for the patient. The discrepancy between the percental distribution in the Duke's series and ours can be explained by two factors. First, Duke¹¹ failed to follow accurately the Broders¹² method of grading. In his article "Histological Grading of Rectal Cancer" he said:

The system of grading tumors described by Broders supplies such a standard. . . . It can be applied easily to malignant growths of the adenocarcinoma type provided one bases the judgment on a general survey and not on a single field of the microscope. Actually the decision as to the grade of malignancy is more dependent on the arrangement of the cells than on the relative number of so-called undifferentiated cells.

11. Dukes, Cuthbert: Histologic Grading of Rectal Cancer, Proc. Roy. Soc. Med. 30: 371-376 (Feb.) 1937.

12. Footnotes 1 and 2.

This accounts for the comparatively low percentage of the grade 1 growths. Many grade 1 lesions have the general histologic arrangement of the average grade 2 growths, and it is only by considering the relative number of dedifferentiated cells and their degree of dedifferentiation that the proper distinction can be made. The second factor is that Duke¹¹ graded colloid carcinoma separately. We do not believe that this is necessary.

There is difference of opinion as to the degree of malignancy of colloid carcinoma. Some observers believe that formation of mucus is a sign of functional

TABLE 4.—*Operative Mortality and Three and Five Year Survival Rates According to Class of Lesion (Lockhart-Mummery and Dukes)—426 Traced Patients Out of 432 Operated On*

Class	Patients Operated On	Patients Traced	Operative Mortality,* per Cent	Percentage of	
				Patients Alive After 3 Years	Patients Alive After 5 Years
A	116	115	12	76.5	69.6
B	121	120	16	51.6	32.2
C	195	191	29	31.5	14.6

* All patients who died within a month in the hospital are included in the operative mortality.

differentiation of the carcinoma cell and that carcinomas showing mucoid degeneration possess a relatively low degree of malignancy. Others believe that mucoid carcinomas, which are the most undifferentiated structurally, secrete the most mucinous material. Raiford¹³ stressed the importance of distinguishing between true primary mucoid carcinoma and mucoid degeneration. He preferred the term "mucoid carcinoma" to "colloid

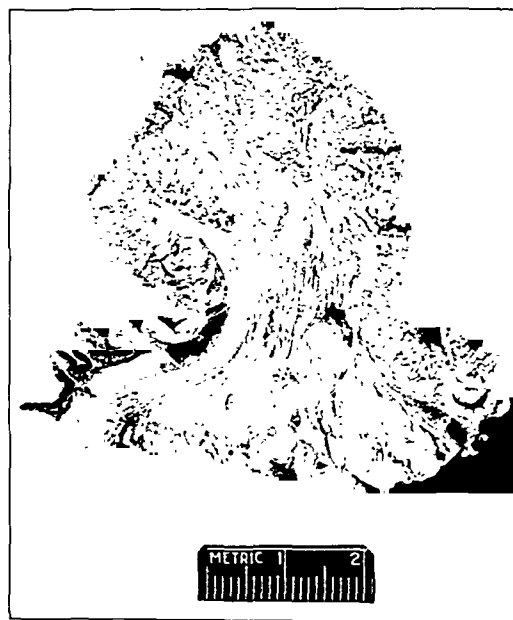


Fig. 5.—Carcinoma of the rectum, class C, grade 1.

carcinoma," and in a series of 166 rectal carcinomas he found five primary mucoid carcinomas and thirty-six which showed mucoid degeneration. In our series we found only eight mucoid carcinomas, and all were graded either 3 or 4. We found mucoid degeneration frequently in the lower grade lesions. Raiford's¹³ table shows the results of treatment of forty-one patients;

13. Raiford, T. S.: Mucoid Carcinoma of the Gastro-Intestinal Tract: So-Called Colloid Cancer, Surg., Gynec. & Obst. 55: 409-417 (Oct.) 1932.

18 per cent (of eleven patients who had primary mucoid carcinomas) were alive at the end of five years, and 56 per cent of those who had adenocarcinomas and mucoid degeneration were living five years after treatment. He stated that the degree of the formation of mucus is inversely proportional to the grade of malignancy.



Fig. 6.—Section of a carcinoma which has extended just to the fascia propria of the rectum (hematoxylin and eosin stain; slightly reduced from a photomicrograph with a magnification of 15 diameters).

nancy. This view is supported by Ochsenschirt,¹⁴ who studied 188 carcinomas in which the secretion of mucus was prominent. Rankin and Olson¹⁵ found forty-four cases of colloid carcinoma in a series of 453 cases of carcinoma of the colon. They believed that the prognostic difference between colloid and other carcinomas is not great but that colloid carcinomas are likely to present a more serious problem. They did not divide their cases into those involving mucoid carcinomas and those involving carcinomas with mucoid degeneration.

DISTRIBUTION ACCORDING TO CLASS

In this series of 432 resected specimens, 116, or 26.85 per cent, were classed as A, 121, or 28 per cent, as B, and 195, or 45.15 per cent, as C (table 4). Dukes,¹¹

TABLE 5.—Percental Distribution According to Class of Malignancy (Lockhart-Mummery and Dukes)—Comparison of the Results in Five Investigations

Series	Total Patients	Per Cent		
		Class A	Class B	Class C
Broders, Bule and Laird.....	354	28.5	28.2	43.2
Dukes.....	142	21.0	35.2	43.0
Lockhart-Mummery.....	354	30.0	42.3	27.7
Wood and Wilkie.....	59	22.0	42.3	35.6
Gabriel, Dukes and Bussey.....	87	27.6	40.2	32.2

reporting a long series of cases of carcinoma of the rectum in which the lesions had been accepted by surgeons as being operable, gave the distribution as follows: class A, 15 per cent; class B, 35 per cent, and class C, 50 per cent. However, in a series of 142 patients who survived operation, the percental distribution approximates that in this series. This is shown in table 5, which includes the record of other investigators who have used the Dukes classification. In this table is also shown the percental distribution among 354

cases of our series which were selected so as to be comparable with the other series in this table.

The percental distribution according to class is a measure of the type of lesion that the surgeon usually removes at operation, and the lesion is therefore one that is considered operable. It is evident in Lockhart-Mummery's⁴ series that he has recently accepted a greater proportion of class C lesions as operable.

TABLE 6.—Operative Mortality and Three Year and Five Year Survival Rates According to Grade of Malignancy (Broders)—426 Traced Patients Out of 432 Operated On

Grade	Patients Operated On	Patients Traced	Operative Mortality,* per Cent	Percentage of	
				Patients Alive After 3 Years	Patients Alive After 5 Years
1	73	73	7.0	85.0	65.7
2	241	237	16.6	48.9	31.0
3	100	98	22.2	35.7	22.4
4	18	18	28.0	16.6	11.1

* All patients who died within a month in the hospital are included in the operative mortality.

When the distribution of "class" and "grade" are compared (fig. 7), it is found that in grade 1 lesions the proportion of class A to class C growths is approximately 3:1; in grade 2, 1:2; in grade 3, 1:5; and in grade 4 the proportion would be greater than 1:10 if those cases in which metastasis is present were included. Because only those grade 4 lesions in which prognosis was extremely favorable for the patients were operated on in 1929 and 1930, the proportion of class A to class C lesions was smaller.

We compared the percentages of five year survivals of patients whose lesions were in classes A, B and C as reported in four other investigations and ours (table 1). Our calculations in this instance were based on the 354 cases which were comparable to those in the other series. The percentages of five year survivals of patients in each class do not coincide exactly, but the figures are in close enough agreement for their differ-

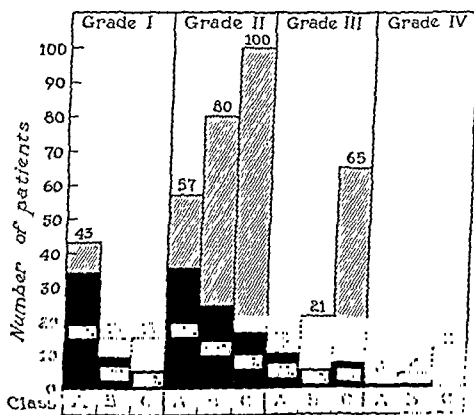


Fig. 7.—Four hundred and twenty-six traced patients whose lesions have been graded and classed, showing the relationship of distribution, grade, class and five year results. The numbers in the black columns indicate patients (per cent) alive at the end of five years for each class and grade of lesion, calculated from the number of traced patients with each class and grade of lesion who underwent resection. The height of the shaded columns indicates the number of patients who underwent some form of surgical excision and who have been traced.

ence to be explained by the variation in the type of operation done.

Operative mortality is four times as great among patients who have grade 4 lesions as among those who have grade 1 tumors (table 6), and the chance of surviving five years after operation for a patient who has

14. Ochsenschirt, N. C.: The Significance of Mucus-Forming Cells in Carcinoma of the Large Intestine and Rectum, Surg., Gynec. & Obst. 47: 32-35 (July) 1928.

15. Rankin, F. W., and Olson, P. F.: The Hopeful Prognosis in Cases of Carcinoma of the Colon, Surg., Gynec. & Obst. 56: 366-374 (Feb.) 1933.

a grade 4 lesion is 11 per cent, about a sixth of that for patients who have grade 1 lesions. These facts lend justification to the conservatism of those surgeons who observe caution and often refuse to operate on patients who have grade 4 carcinomas.

The operative mortality of patients who have class C lesions is almost twice that of patients whose lesions are in class A, whereas the chance of surviving five years for a patient who has a class C lesion is a fifth as great as in one who has a class A lesion (table 4). If the percentage of five year survival of patients is calculated, the rate for those who have class A lesions is 69.6 per cent, for those who have class B lesions 32.2 per cent and for those who have class C lesions 14.6 per cent. On the same basis, the five year survival rate for patients who have grade 1 lesions is 65.7 per cent, for those who have grade 2 lesions 31.6 per cent, for those who have grade 3 lesions 22.4 per cent, and for those who have grade 4 lesions 11.1 per cent (table 6).

The relationship of grading and class to the five year survival rate has been discussed. Figure 7 shows the distribution and the relationship of grade and class to the five year survival rate. In this figure an actual and relative decrease in the number of patients who are alive five years after operation is shown as the grade increased from 1 to 4 and as the growth advanced from A to C in each grade. The advantage of combining the two classifications in relationship to the number of patients alive five years after resection is clear. In each grade the ratios of five year cures are approximately three, two and one with respect to class A, B and C. For example, 65.7 per cent of all patients who have a grade 1 carcinoma and who survive operation are alive five years after resection (table 6). In grade 1 cancers the chance that the resected specimen is in class A is three times that of its being in class C. According to whether the growth removed is in class A, B or C of grade 1, the chances for survival of the patient five years after operation are, respectively, 77 per cent, 60 per cent and 33 per cent (fig. 7).

On the basis of our studies, it can be said that 22.4 per cent of all patients who survive resection of a grade 3 carcinoma will be alive five years after operation (table 6). There is a 65 per cent chance that a grade 3 tumor will be in class C, in which patients who have such a lesion have a five year survival rate of 11 per cent. There is a 21 per cent chance that the lesion will be in class B, in which patients having such a lesion have a 24 per cent chance of a five year cure, and there is a 12 per cent chance that the lesion will be in class A, in which patients have an 83 per cent chance of living five years or longer (fig. 7).

As the grade increases from 1 to 4 there is a proportionately lessened chance that the patient will be alive five years after operation, and patients who have class A lesions in each grade except grade 4 have a better chance of being alive five years after operation.

We wished to determine whether or not carcinomas of high grade grew faster and caused death more quickly than those of lower grades. The average duration of life was therefore calculated for patients, according to lesions in each grade, who had survived operation for less than five years. The average duration of life of such patients who had grade 1 carcinomas was 29.5 months; grade 2, 26.5 months; grade 3, 25 months, and grade 4, 20 months. On the basis of such evidence it would appear that the rate of growth or at least the speed with which metastases terminate life is directly proportionate to the grade of malignancy.

SUMMARY AND CONCLUSIONS

Four hundred and thirty-two resected specimens of carcinoma of the rectum were graded according to the Broders¹² method and also grouped according to the Dukes method of classification. The distributions of grade and class were studied in comparison with other investigations and also in relationship to survival after operation. On the basis of the entire study, certain conclusions were reached:

1. The presence or absence of mucus loses importance as a guide to prognosis if histologic grading is done by the Broders method.

2. Tumors of higher grades are more rapid in growth and their metastases cause the death of the patient earlier than those of lower grades.

3. The classification of the lesion according to the method of Dukes is also correlated with postoperative life; the higher the class, the less the percental survival.

4. A combination of the Broders grading and the Dukes classification yields a prognosis of survival more accurate than either method taken separately.

EXPERIMENTAL WESTERN EQUINE
ENCEPHALOMYELITISSUCCESSFUL TREATMENT WITH HYPERIMMUNE
RABBIT SERUM

JOSEPH ZICHIS, PH.D.

AND

HOWARD J. SHAUGHNESSY, PH.D.

CHICAGO

There is a general impression that treatment of a disease in which the etiologic agent is a virus is of no value after the infection has become established. Rivers¹ probably presented the opinion of other authorities as well as his own when he wrote the following in 1936: "Such a phenomenon throws light on the clinical observations that the administration of convalescent or immune serum to an individual in whom the signs and symptoms of a virus disease are already manifest is without value." It is of interest that Rivers² has indicated (in the Lane lectures given by him in 1939) that he has modified his point of view to the extent of admitting that measles can be treated after the onset of the typical early signs and symptoms of the disease. However, the majority of clinicians and investigators hold to the view expressed by this authority in 1936. The conception that "once a virus has entered a cell no amount of antiserum brought in contact with the cell can injure the virus or hinder its activity" has resulted from the investigations of several groups of competent workers³ on serum therapy of virus infections of tissue cultures. If this is admitted as a fact,

From the Division of Laboratories, Illinois Department of Public Health.

1. Rivers, T. M.: Recent Advances in the Study of Viruses and Viral Diseases, J. A. M. A. **107**: 206-210 (July 18) 1936.

2. Rivers, T. M.: Lane Medical Lectures: Viruses and Virus Diseases, Stanford Univ. Publ., Univ. Series M. Sc. **4**: 1-33, 1939.

3. Rivers, T. M.; Haagen, E., and Muckenfuss, R. S.: Observations Concerning Persistence of Living Cells in Maitland's Medium for Cultivation of Vaccine Virus, J. Exper. Med. **50**: 665-672 (Nov.) 1929. Andrewes, C. H.: Virus III in Tissue Cultures: Further Observations on Formation of Inclusion Bodies; Experiments Bearing on Immunity, Brit. J. Exper. Path. **10**: 273-280 (Aug.) 1929; Antivaccinal Serum: Evidence of Slow Union with Virus in Vitro, J. Path. & Bact. **33**: 265-272 (April) 1930. Downie, A. W., and McGaughey, C. A.: Experiments with Virus of Ectromelia: Action of Immune Serum in Vivo and on Growth of Virus in Culture, *ibid.* **40**: 297-310 (March) 1935. Sabin, A. B.: Mechanism of Immunity to Filtrable Viruses; Fate of Virus in System Consisting of Susceptible Tissue, Immune Serum and Virus, and Role of Tissue in Mechanism of Immunity, Brit. J. Exper. Path. **16**: 84-101 (Feb.) 1935.

it seems equally apparent that all cells are not invaded at once in most virus infections at least. From studies of infections in tissue cultures it has also been learned that, if serum is brought into contact with cells before their exposure to virus, infection may be aborted. Therefore, even after the development of early signs and symptoms of a disease, the administration of serum should be of value to the person or animal by penetrating the cells surrounding the parasitized cell and neutralizing any virus which attempts to invade them. The acceptance of these premises suggests that investigation of the effect of serum on the whole organism infected by a disease should give one a better understanding of the potentialities of serum therapy than do studies made on infected cells in tissue cultures.

killed more than one month later. This is compared with the control group in which only one of the five recovered animals showed extensive pulmonary lesions. Practically all the remaining animals in both groups of serum treated mice showed some pulmonary lesions while three of the five survivors in the control group had no lesions at all. Laidlaw and his colleagues made this significant statement: "Here it may be noted that these lesions were convincing evidence that the virus had reached and produced damage in the lungs, and that concentrated serum was powerful enough to arrest the pathological process."

Prevention or modification of measles by convalescent or "normal" serum is so generally accepted that it has become a routine service of physicians in many com-

TABLE 1.—Observations in Experiment 3

Days	Treated with Serum at Onset of Fever								Treated with Serum When Animals Were Visibly Ill								Untreated Controls							
	Guinea Pig 1		Guinea Pig 2		Guinea Pig 3		Guinea Pig 4		Guinea Pig 5		Guinea Pig 6		Guinea Pig 7		Guinea Pig 8		Guinea Pig 9		Guinea Pig 10		Guinea Pig 11		Guinea Pig 12	
	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms	Temperature	Symptoms
1	101.2	N	100.0	N	100.0	N	101.3	N	100.0	N	99.6	N	101.4	N	102.0	N	100.2	N	100.0	N	99.8	N	100.0	N
2	100.1	N	101.4	N	99.8	N	101.0	N	101.0	N	100.0	N	100.2	N	101.7	N	100.3	N	100.3	N	100.4	N	102.3	N
3	101.2	N	100.0	N	101.0	N	102.3	N	102.0	N	100.8	N	100.0	N	100.8	N	100.0	N	102.4	P	101.5	N	102.4	N
4	102.4	P	100.0	N	100.4	N	101.3	N	102.0	N	101.0	N	99.8	N	100.4	N	101.2	N	103.4	P	101.4	N	101.4	N
5	102.0	N	100.1	N	101.2	N	101.0	N	100.0	N	101.0	N	100.4	N	101.2	N	101.2	N	103.4	P	101.4	N	101.4	N
6	102.3	P	102.0	N	101.4	P	102.8	N†	100.0	N	101.0	N	100.4	N	101.2	N	101.2	N	103.4	P	101.4	N	101.4	N
7	102.0	N	102.0	N	101.8	N	103.8	N	102.8	S†	103.0	N	102.6	P	101.9	P	103.4	S	103.8	S	100.3	P	102.3	N
8	103.6	P†	101.6	N	102.4	S†	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
9	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
10	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
11	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
12	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
13	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
14	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
15	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
16	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
17	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
18	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
19	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P
20	101.7	N	104.0	S†	101.7	N	101.7	N	104.0	S	101.0	P	104.0	S	103.4	P	101.0	Pa	104.0	S	100.0	S	103.8	P

*, upper temperature a. m., lower p. m.
†, 10 cc. of serum given intraperitoneally.
N, no symptoms.
P, roughened coat, passive, not eating.
S, visibly sick.

Pa, paralyzed.
R, released.
PR, partial paralysis.
M, moribund.

There are several examples of apparently successful serum therapy of virus diseases in man or experimental animals which deserve to be better known. The first of these was the study of serum therapy of influenza in mice reported in 1935 by Laidlaw, Smith, Andrewes and Dunkin.⁴ They found that concentrated serum obtained from a hyperimmunized horse had "a beneficial action on mice already infected with virus." In their main experiment the fatality in three groups of twenty-five mice each was as follows: controls given no serum, twenty deaths; mice receiving serum twenty-four hours after injection of virus, eight deaths, and mice receiving serum forty-eight hours after injection of virus, ten deaths. Probably their most striking observations were that ten of the seventeen successfully treated mice that received serum twenty-four hours after infection and ten of the fifteen successfully treated mice that received serum forty-eight hours after infection showed extensive lesions of the lungs when

munities. The general opinion has been, however, that serum therapy is of no value after the catarrhal symptoms have appeared. Until very recent years the few studies which had been made were unsuccessful or inconclusive. Most of the patients treated after onset of clinical symptoms received only from 5 to 10 cc. of convalescent serum by the intramuscular or subcutaneous routes, which is about the prophylactic dose. In 1936 Levinson⁵ and in 1939 Levinson and Conner⁶ made an attempt to secure objective evidence of the effect of serum therapy of measles after the appearance of clinical symptoms and Koplik spots but before the eruption. They limited their cases to those in the pre-eruptive stage because of the well known fact that the temperature subsides and symptoms diminish after the appearance of the rash. Their results in the treatment of sixteen patients with measles, fifteen of whom were

4. Laidlaw, P. P.; Smith, Wilson; Andrewes, C. H., and Dunkin, G. W.: Influenza. The Preparation of Immune Serum in Horses, Brit. J. Exper. Path. 16: 275-291 (June) 1935.

5. Levinson, S. O.: Human Convalescent Measles Serum: Its Use in Prophylaxis and Therapy, Proc. Chicago Inst. Med., vol. 11, No. 6, June 15, 1936.

6. Levinson, S. O., and Conner, J. A.: The Treatment of Active Measles with Human Convalescent Serum, J. Pediat. 14: 368 (Feb.) 1939.

hospitalized for other infectious diseases, were striking. Six patients had a normal temperature on the evening of the day the rash appeared, although it is usually stated that the temperature should be highest at about that time. In most of the other cases there was a sharp drop in temperature. The character of the eruption was greatly modified and the alleviation of the other

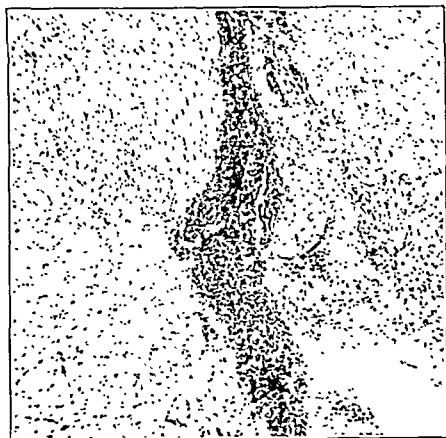


Fig. 1.—Section of brain of untreated guinea pig; $\times 48$.

signs and symptoms, particularly the cough, was marked. In analyzing the reasons for their success and the failure of previous workers it must be emphasized that Levinson and Conner used from 20 to 50 cc. of convalescent serum and administered it intravenously. These dosages are equivalent to from five to ten times those used by other investigators, and the intravenous route made the serum more available. Kohn, Klein and Schwarz⁷ also reported that from 40 to 50 cc. of convalescent serum given intravenously in the pre-eruptive or early eruptive stages was successful in modifying the disease. They also found that 200 cc. of "normal" human serum was needed to obtain the same results secured with from 40 to 50 cc. of convalescent serum.

Meyer and Eddie⁸ recently reviewed the literature on the treatment of psittacosis by convalescent serum and found that the opinion of most of those who had used it was favorable. They cited a case of their own in which convalescent serum was successfully employed in large dosage and state "The causal relationship between the injection of the serum and the crisis is too apparent to be merely a coincidence." They also observed that convalescent serum is of low potency and that better results should be expected from a hyperimmune serum. While these observations are, of course, not conclusive, they add an impression that another virus disease can be treated successfully with serum if large enough dosages are employed.

While the possibility that man can be infected by the virus of equine encephalomyelitis was pointed out by Meyer⁹ a number of years ago, interest in the human disease was first aroused by the Massachusetts epidemic¹⁰ in 1938. Since that outbreak, which is

believed to have caused about thirty deaths, a number of other cases have been reported. It is quite natural that serum therapy should have been attempted in the treatment of such a highly fatal disease. However, the isolated reports on the few human cases of equine encephalomyelitis treated with serum have been either disappointing or unconvincing. These results are probably not significant in view of the relatively small dosage of serum employed and the lack of knowledge concerning its potency.

The only previous report that we have seen on the use of serum in the treatment of equine encephalomyelitis in experimental animals is that of Wyckoff and Tesar.¹¹ These investigators worked with a commercial unrefined hyperimmune horse serum. Unfortunately no data were presented concerning its potency. Monkeys each receiving 10 cc. of this serum twenty-four and three hours respectively before intranasal instillation of virus were protected. They were not immune when tested by another intranasal instillation of virus seven weeks later, indicating that their immunity had been due to "passive inhibition of infection." Monkeys given 10 cc. of serum at the first appearance of fever and again twenty-four hours later were not benefited in any way. This was true with the use of both Western and Eastern serums. In another series of experiments Wyckoff and Tesar gave 10 cc. of serum intravenously to monkeys three or twenty-four hours after virus was administered intranasally. Three of the six monkeys treated in this manner were protected but were reinfected intranasally seven weeks later, indicating that the protection "had been essentially passive." They concluded that serum "given at the time of first symptoms (fever), or later, has been without beneficial influence upon the course of either Eastern or Western disease."

This is a progress report of our studies on the treatment of Western equine encephalomyelitis with rabbit

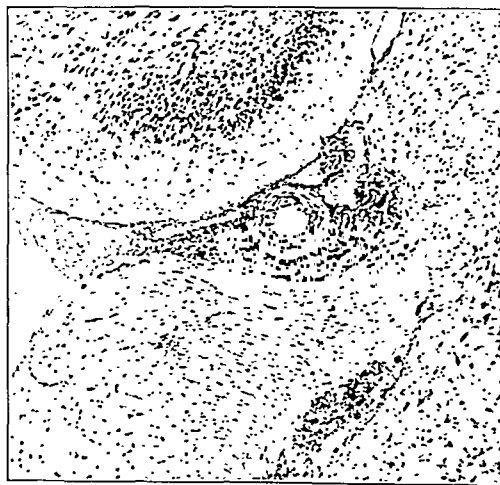


Fig. 2 (guinea pig 8, table 2).—Section of brain of guinea pig treated with serum when visibly ill; killed twelve days after treatment; $\times 48$.

hyperimmune serums. It should be emphasized that the potency of rabbit serum prepared in this laboratory was much higher than that of commercial horse serums which we have tested. The protection test used in standardizing our serum is also a more rigorous procedure than the *in vitro* neutralization test commonly employed.

7. Kohn, J. L.; Klein, I. F., and Schwarz, Herman: Treatment of Preeruptive Measles with Convalescent Serum, *J. A. M. A.* **111**: 2361-2364 (Dec. 24) 1938.

8. Meyer, K. F., and Eddie, B.: The Value of the Complement Fixation Test in the Diagnosis of Psittacosis, *J. Infect. Dis.* **65**: 225 (Nov.-Dec.) 1939.

9. Meyer, K. F.: A Summary of Recent Studies on Equine Encephalomyelitis, *Ann. Int. Med.* **6**: 645 (Nov.) 1932.

10. Fothergill, L. D.; Dingle, J. H.; Farber, Sidney, and Connerlev, M. L.: Human Encephalomyelitis Caused by the Virus of the Eastern Variety of Equine Encephalomyelitis, *New England J. Med.* **219**: 411 (Sept. 22) 1938. Feemster, R. F.: Outbreak of Encephalitis in Man Due to the Eastern Virus of Equine Encephalomyelitis, *Am. J. Pub. Health* **28**: 1403 (Dec.) 1938.

11. Wyckoff, R. W. G., and Tesar, W. C.: Equine Encephalomyelitis in Monkeys, *J. Immunol.* **37**: 329 (Oct.) 1939.

METHODS AND MATERIALS

Virus.—The Western equine encephalomyelitis virus was employed in these studies. The strain used was obtained from Dr. Carl Ten Broeck of the Rockefeller Institute for Medical Research in January 1939 and was labeled "Western E. E. Kelser." In this laboratory the

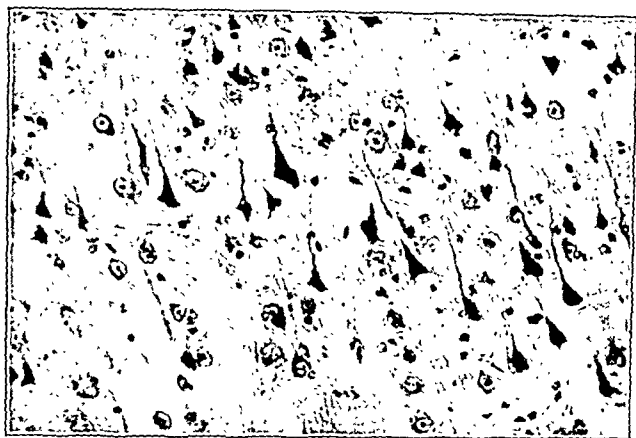


Fig. 3 (guinea pig 5, table 2).—Section of brain of guinea pig treated with serum when visibly ill; killed twelve days after treatment; slightly reduced from a photomicrograph with a magnification of 200 diameters.

virus has been maintained by serial intracerebral passages in guinea pigs. Since receiving this virus its identity has been established several times by protection tests with a specific immune serum¹² and by cross protection tests with a known Western equine encephalomyelitis virus.¹³

In the treatment experiments guinea pig brain virus was used for the inoculation of all the animals, whereas in the hyperimmunization experiments for the production of immune serum a virus which had been cultivated on the developing chick embryo was used. The dilutions of the guinea pig brain virus were made in heart infusion broth in each case, while the chick embryo virus was diluted with buffered physiologic solution of sodium chloride.

Animals.—Guinea pigs of about 400 Gm. and Swiss mice of about 20 Gm. weight were used in the serum treatment studies. Rabbits, each weighing about 4 Kg., were selected for the production of the hyperimmune serum. Rabbits were selected because it is believed that protective antibodies produced in them are of small molecular dimensions and for this reason are probably able to penetrate to the infected tissues more rapidly.

Production of Hyperimmune Serum.—The virus used for the hyperimmunization of the rabbits was propagated on developing chick embryos. After eleven days of incubation the embryos were inoculated through an opening in the shell with a bacteria free virus. Following inoculation on the chorio-allantoic membrane the eggs were sealed with paraffin and reincubated until the embryo died. As a rule all the embryos were dead within twenty hours after inoculation. The embryos were then removed from the eggs and ground in a tissue mill. The minced tissue was adjusted to a 20 per cent suspension with buffered physiologic solution of sodium chloride, following which the suspension was centrifuged for fifteen minutes at 2,000 revolutions per minute to remove tissue particles. The preparation of this virus was carried out under strict aseptic precautions and only virus that was found to be free of bacterial

contamination was used for hyperimmunization of the rabbits. The minimum lethal dose of the virus was about 10^{-10} for Swiss mice.

Each rabbit was injected subcutaneously with two 3 cc. doses of Western virus chick embryo vaccine treated with formaldehyde. The injections were made seven days apart, and ten days after the last dose each rabbit was injected intravenously with 0.5 cc. of the 20 per cent living virus suspension. Thereafter the animals were injected intravenously on Monday, Wednesday and Friday of each week, the dose being doubled at each injection until the maximum amount of 5 cc. was reached. It was found necessary to follow this schedule of immunization for at least twelve weeks before a serum of high potency could be obtained.

Determination of Potency of Serum.—The protective value of the serum was determined on Swiss mice. The test consisted of injecting each of six mice subcutaneously with 1 cc. of one of the following dilutions of the serum: (1) undiluted, (2) 1:100, (3) 1:500, (4) 1:1,000 and (5) 1:1,200. Twenty-four hours after the inoculation of the serum each mouse was injected intracerebrally with 0.03 cc. of a 1:10,000 dilution (about ten times the minimum lethal dose) of guinea pig brain virus. To demonstrate the virulence of the virus, six normal mice were similarly injected with the same preparation of the virus. The mice were kept in individual cages and were observed for twenty-four days.

In these experiments a lot of rabbit hyperimmune serum was not used unless 1 cc. of a 1:1,000 dilution protected at least two thirds of the mice in the potency test. The serum was not concentrated and did not contain a preservative. Rabbit serum was employed in all experiments excepting experiment 4, in which a commercial horse serum was used.

EXPERIMENTS

EXPERIMENT 1.—Each of fourteen Swiss mice was inoculated intracerebrally with 0.03 cc. of a 1:10,000 dilution of infected guinea pig brain. Each of eight of these received 1 cc. of the serum by the intraperitoneal route forty-eight hours following the inoculation of virus. The remaining six mice were not treated with serum and were employed as the untreated controls.

One treated mouse became sick on the fifth day following the injection of virus and died three days later. Its brain and heart blood were cultured and were found to be free of bacterial contamination. Another mouse did not eat and appeared sick for two days following the serum administration but made a complete recovery. The remaining six treated animals did not show any signs of the infection. All the untreated control mice showed symptoms of the disease on the third day following exposure to the virus and died within eight days. In each case, except in one in which an air contaminant was encountered, the cultures of the specimens of heart blood were negative.

Twenty days after inoculation with the virus the seven mice that were treated with serum were tested for immunity. Each was inoculated intracerebrally with 0.03 cc. of a 10^{-8} dilution (about a hundred times the minimum lethal dose) of Western type chick embryo virus. The dilutions were made in heart



Fig. 4 (guinea pig 1, table 2).—Section of brain of guinea pig treated with serum when visibly ill; killed twenty-nine days after treatment was instituted; $\times 64$.

12. Supplied by Dr. W. G. Malcolm of the Lederle Laboratories.
13. Supplied by the United States Bureau of Animal Industry.

infusion broth. All became infected and died, demonstrating that they did not become immunized as a result of the inoculations with virus and serum.

EXPERIMENT 2.—Fourteen Swiss mice were used in this experiment. Each was inoculated intracerebrally with 0.03 cc. of a 1:10,000 dilution of guinea pig brain virus. Eight of the animals were treated with serum when they showed visible signs of sickness; the remaining six were not given serum and constituted the untreated controls. All the mice became visibly sick within three to six days after injection of the virus. The mice that were considered to be visibly ill showed the following signs: slowness of movement, roughened coat, refusal of food, tremors and, in some cases, prostration and partial paralysis. The serum was administered intraperitoneally in 2 cc. doses.

Of the eight treated mice three died and five recovered completely. Of the three animals that died one received one dose of serum, the other two and the third three. Three of the mice

The treatment consisted of inoculating the animals intraperitoneally with 10 cc. doses of the serum. The temperatures of the guinea pigs that were to be treated at the onset of fever were taken twice a day and of the others once a day. It is recognized that excessive handling is distinctly harmful to persons or animals with an infection of the central nervous system. To avoid this possibility temperatures of the animals were not taken after the commencement of serum therapy. The results of this experiment are shown in table 1.

As shown in this table, the four guinea pigs that were treated with serum at the onset of fever recovered after showing only slight evidence of the infection. It was necessary to give each of these animals only one 10 cc. dose of serum. Of the four guinea pigs that were treated when definite signs of illness were observed, three survived and one died. To effect recovery in this group, however, it was necessary to administer from 20 to 40 cc. of the serum to each of the animals. All the untreated control guinea pigs contracted the disease and died.

TABLE 2.—Experiment 5, Group 3 Treated with Hyperimmune Rabbit Serum When Visibly Ill

	Guinea Pig 1		Guinea Pig 2		Guinea Pig 3		Guinea Pig 4		Guinea Pig 5		Guinea Pig 6		Guinea Pig 7		Guinea Pig 8		Guinea Pig 9		Guinea Pig 10	
Days	Tem- pera- ture	Symp- toms	Tem- pera- ture	Symp- toms	Tem- pera- ture	Symp- toms	Tem- pera- ture	Symp- toms	Tem- pera- ture	Symp- toms	Tem- pera- ture	Symp- toms	Tem- pera- ture	Symp- toms	Tem- pera- ture	Symp- toms	Tem- pera- ture	Symp- toms	Tem- pera- ture	Symp- toms
1.....	100.5	N	100.5	N	100.0	N	100.1	N	99.7	N	101.0	N	100.8	N	101.0	N	98.9	N	100.0	N
2.....	100.0	N	100.5	N	100.2	N	101.6	N	102.2	N	102.0	N	101.0	N	102.6	N	100.4	N	99.0	N
3.....	101.5	N	102.0	N	103.5										103.0	P	100.5	N	100.6	N
4.....	100.5	N	101.8	N	103.6	Pa	100.8	N	101.3	N	101.0	N	101.5	N	103.6					
					Died while		102.2													
					serum was		102.2	P	98.6	N	101.3	N	101.4	N	104.4	S PR†	99.0	N	102.4	N
					being given															
5.....	101.3	P	100.6	N			102.8	PaM	103.3	P	102.8	S†	101.8	N		S	101.7	S§	102.0	P
6.....	102.5	S	100.1	N			Died before		101.5	P	101.7	Pa†	101.9	P		S	97.2	Pa†	101.6	P
					serum was		given													
7.....	102.0	PR†	100.0	N					103.5	PR†		M	103.5	S†		S†		Pa†	101.0	S†
8.....		Pa†	101.8	N						S	Dead		103.9	S†		P		PR†	99.5	S
9.....		PR†	100.5	N						S†				S		N	Dead; pericar-			S†
																	dial hemorrhage			
10.....		S†	100.7	N						S†				S†		N				S
11.....		S†	100.7	N						S†				N		N				N
12.....		P		N						N				N		N				N
13.....		P		N						N				N		N				N
14.....		N		N						N				N		N				N
15.....		N		N						N				N		N				N
16.....		N		N						N				N		N				N
17.....		N		N						N				N		N				N
18.....		N		N						N				N		N				N
19.....		N		N						N				N		N				N
20.....		R		R						R				R		R				R

†, 10 cc. of serum given intraperitoneally.

‡, 5 cc. of serum given intraperitoneally.

§, 5 cc. of physiologic solution of sodium chloride given subcutaneously.

§, 5 cc. of serum given intracardially.

N, no symptoms.

P, roughened coat, passive, not eating.

S, visibly ill.

Pa, paralyzed.

R, released.

PR, partial paralysis.

M, moribund.

that recovered were each given two doses of the serum, while each of the remaining two was given three doses. The surviving mice were tested for immunity twenty-four days later by intracerebral inoculation of each with 0.03 cc. of a 1:10,000 dilution of guinea pig brain virus. None of the animals became infected, showing that they had developed an active immunity as a result of having an attack of the disease from which they recovered following treatment with serum.

The control mice all became visibly sick in from three to four days after injection of the virus and died within ten days. Cultures of the heart blood of none of the animals that died in the course of this experiment showed any bacterial contamination.

EXPERIMENT 3.—Twelve guinea pigs were used in this experiment, of which each was inoculated intralingually with 0.4 cc. of a 1:100 dilution (at least a hundred times the minimum lethal dose) of infected guinea pig brain. The animals were divided into the following groups: four were given serum at the onset of the first rise in temperature, four were treated when they showed visible signs of the disease and four were not given serum and were employed as the untreated controls. The guinea pigs were adjudged visibly sick if they showed fever, roughened coats, refusal of food, slowness of movements, ataxia and in some instances partial paralysis.

Cultures were made of the heart blood of each animal that died and in every case they were negative.

The seven surviving guinea pigs were tested for immunity twenty days after exposure to the virus by injecting each intracerebrally with 0.25 cc. of a 1:10,000 dilution (about ten times the minimum lethal dose) of guinea pig virus. All four animals that were treated with serum at the onset of fever and one (guinea pig 5) of the group that was treated after characteristic symptoms were observed contracted the disease and died. The two remaining animals that were treated when visibly sick survived without showing any apparent signs of infection. They appeared to have acquired an active immunity from their exposure to the virus, indicating that infection had occurred.

EXPERIMENT 4.—In this experiment a commercial horse serum, produced by hyperimmunization of horses with chick embryo virus, was used for treatment. This serum, when tested for its protective value by the method described, was found to protect when undiluted serum was used, but only one third of the mice injected with the 1:10 dilution of serum survived. The higher dilutions did not show any protective properties. This serum was of low potency, apparently having only about one thousandth the protective value of our hyperimmune rabbit

serum. Consequently, as would be expected, the results of serum treatment in this experiment were not satisfactory.

Each of sixteen Swiss mice was injected intracerebrally with 0.03 cc. of a 1:10,000 dilution of guinea pig virus. In addition each of seven guinea pigs was injected intralingually with 0.4 cc. of a 1:100 dilution of the same virus. The mice were divided into the following groups: Four were treated with

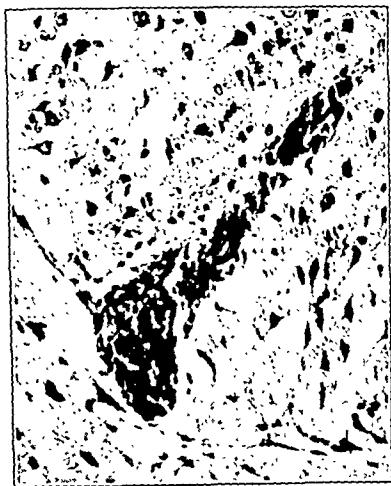


Fig. 5 (guinea pig 1, table 2).—Section of brain of guinea pig treated with serum when visibly ill; killed twenty-nine days after treatment was instituted; $\times 160$.

serum twenty-four hours and four forty-eight hours after inoculation with the virus, four when visible signs of infection could be observed and four were not treated and were used as controls. Of the guinea pigs five were treated with serum at the time they showed visible signs of the disease and two were used as untreated controls.

The mice that were given 2 cc. of the serum twenty-four hours after exposure to the virus survived without showing any apparent signs of infection. All the mice to which serum was administered forty-eight hours after injection of the virus as well as those which were treated when visibly sick and the untreated controls became infected and died. Each of the treated mice in these two groups received about 5 cc. of the serum. Three of the treated mice lived seven days longer than the controls. However, it is not known whether or not this was due to the protective properties of the serum.

Four of the treated guinea pigs died and one recovered. Each of these animals received about 70 cc. of serum. Of the untreated controls one contracted the disease and died whereas the other did not become infected. The brain and heart blood of each animal that died were cultured and, with the exception of one guinea pig brain in which an air contaminant was encountered, were found to be free of bacterial contamination.

In this experiment, in addition to the serum treatment, dextrose solution was administered subcutaneously to the sick animals. Recently it has been reported that dextrose may be toxic to animals with certain virus infections.¹⁴ Possibly this factor may have influenced the results of this experiment.

EXPERIMENT 5.—Thirty-three guinea pigs were used in this experiment, in which hyperimmune rabbit serum was again used. Each of thirty animals was injected intralingually with 0.4 cc. of a 1:50 dilution of a guinea pig brain virus and each of three was injected intracerebrally with 0.25 cc. of the same virus preparation. The animals that were inoculated intralingually were divided into three groups of ten each. In group 1 the animals were not treated with serum and they were used as controls on the infectivity of the virus, in group 2 treatment with immune serum was started at the onset of fever and in group 3 the animals were given serum when they showed visible signs of the infection. The intracerebrally inoculated guinea pigs were employed to establish the virulence of the virus.

The treatment with immune serum consisted of administering the serum intraperitoneally in 10 cc. doses. In addition, for the purpose of keeping up the body fluids physiologic solution of sodium chloride was given in a few cases by subcutaneous inoculation. In a few instances in which the guinea pigs were very sick, about 5 cc. of serum was injected either intravenously or intracardially in order to make the antibodies available more quickly.

14. Hoyt, Anson; Holden, Margaret, and Rawson, Ruth A.: Decreased Tolerance of Mice to Intraperitoneal Glucose Injections in Certain Neurotropic Virus Infections, *Proc. Soc. Exper. Biol. & Med.* **42**: 332 (Oct.) 1939.

In the control group of animals eight contracted the disease and died, while two did not show any apparent infection. Eight of the guinea pigs in group 2 became infected and two did not. The temperature of these animals was taken in the morning and late in the afternoon, and as soon as a rise was observed 10 cc. of serum was administered. All the guinea pigs had a fever within a period of from three to five days following inoculation. Following serum treatment the condition of each animal was observed closely, and if the animal showed further signs of infection more serum was given. Of the eight guinea pigs treated, two showed complete recovery following the administration of the 10 cc. of serum. It was necessary to give four animals an additional 5 cc. One guinea pig at the onset of fever also showed signs of being visibly sick. It was given 10 cc. of serum but died within twelve hours. The remaining animal was killed while serum was being injected intracardially. Thus, of the eight animals treated, six recovered, one died of the infection and one suffered a traumatic death.

In group 3, nine guinea pigs contracted the disease while one escaped infection. Of the nine infected animals five were treated with serum successfully, one was killed while serum was being injected intravenously, one died before treatment could be instituted and one died after it was treated with 15 cc. of serum. One animal died four days after an intracardial injection of serum and when it had apparently recovered from the disease. On autopsy, it was found to have suffered from a pericardial hemorrhage. The results of treatment in group 3 are shown in table 2.

The three control guinea pigs that were inoculated intracerebrally became infected and died within six days. The cultures of the heart blood and brain of each animal that died in the course of this experiment were free from bacterial contamination.

Thirty-three days after the beginning of the experiment we tested four of the recovered guinea pigs for immunity by inoculating each intracerebrally with 0.25 cc. of a 1:1,000 dilution (about a hundred times the minimum lethal dose) of guinea pig brain virus. Two guinea pigs that recovered after treatment with serum at the onset of fever and two animals that recovered following serum treatment when they were

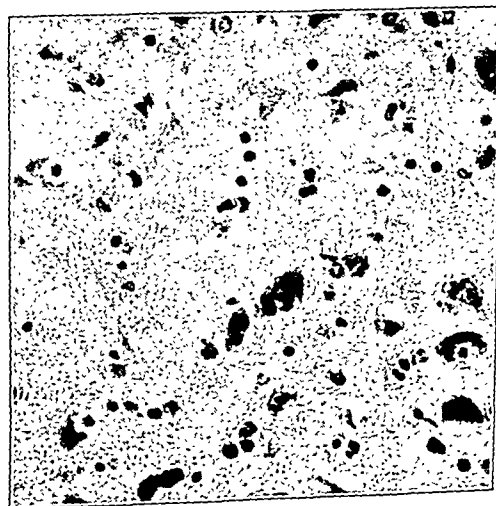


Fig. 6 (guinea pig 1, table 2).—Section of brain of guinea pig treated with serum when visibly ill; killed twenty-nine days after treatment was instituted; $\times 400$.

visibly sick were subjected to this test. The virulence of the virus was tested by the simultaneous injection of two normal guinea pigs intracerebrally. Of the four animals tested for immunity, one that was treated with serum at the onset of fever contracted typical signs of encephalomyelitis and died. None of the remaining guinea pigs became infected, showing that the disease had progressed sufficiently in these animals to produce active immunity. The intracerebrally inoculated animals became infected and died. The summary of the results

of the experiments in which rabbit hyperimmune serum was used for treatment is shown in table 3.

Histopathologic studies¹⁵ were made of the brains of selected animals to determine whether lesions had been present when serum therapy was instituted and to determine whether repair had taken place in the brain tissues of the serum treated guinea pigs. For this purpose two animals that were treated at the onset of fever were killed twelve days after injection of the serum and two of the same series were killed twenty-eight days after serum treatment. Of the animals that were treated with serum after visible illness, two were killed twelve days after the first injection of serum and one was killed twenty-nine days after serum treatment had been instituted. For comparison, sections were made of the brains of six control animals that did not receive serum and died and of two animals that died following injection of serum. The histopathologic studies are here described.

MICROSCOPIC STUDIES

Untreated Guinea Pigs.—Microscopic sections of brains from the control animals disclosed a diffuse and marked inflammatory and degenerative process. There was a mild focal meningeal infiltration of lymphocytes. In some sections there was massive cellular infiltration extending along the fissures (fig. 1). Perivascular infiltration with monocytes and lymphocytes was variable in degree but almost always present. Some proliferation of adventitia could be detected. There was rather diffuse and widespread degeneration of the neurons, which appeared in varying stages of necrosis. In some sections there was focal neuronal necrosis with a marked interstitial cellular reaction consisting of degenerating polymorphonuclear cells, lymphocytes and also glial cells.

Guinea Pigs Treated at Onset of Fever; Killed Twelve Days Later.—A few focal areas of mild lymphocytic meningeal infiltration were visible. The perivascular infiltration, although definite, was minor in degree, consisting of a few loose lymphocytes to a necklace encirclement one cell layer in thickness. Occasional ghost and pyknotic neuronal cells were present.

Guinea Pigs Treated at Onset of Fever; Killed Twenty-Eight Days Later.—These slides were similar to those of the preceding section with the pathologic changes somewhat less evident.

Guinea Pigs Treated When Visibly Sick; Killed Twelve Days Later (table 2, guinea pigs 5 and 8).—There was marked evidence of inflammatory reaction in these sections. There was focal meningeal infiltration with lymphocytes extending down the fissures. Perivascular infiltration and adventitial and intimal proliferation was quite prominent (fig. 2). Many neuronal cells were mere ghosts. Others showed vacuolization or pyknosis with loss of nuclei and irregular outlines (fig. 3). Neuroglial proliferation was evident.

Guinea Pig Treated When Visibly Sick; Killed Twenty-Nine Days Later (table 2, guinea pig 1).—Sections from this animal showed definite evidence of a subsiding inflammatory and degenerative process. Focal infiltration with old lymphocytes could be found (fig. 4). There was a moderate perivascular infiltration of heavily stained mononuclear cells (fig. 5). Adventitial and intimal proliferation of the arterioles was also present. There was little interstitial lymphocytic infiltration, and no polymorphonuclear cells were seen in any of the sections. Degenerated neurons, some pyknotic, others showing vacuolization or disintegration (fig. 6) and some microglial proliferation, were to be seen.

SUMMARY AND CONCLUSIONS

Western equine encephalomyelitis can be treated with hyperimmune rabbit serum with practically complete success in mice forty-eight hours after injection of virus and in guinea pigs after the appearance of the first sign (fever) of the disease. About two thirds of the animals treated with serum when the infection has progressed to the point at which visible signs of the disease manifest themselves can be saved. The fatality in control animals not receiving treatment is 100 per cent.

Probably a higher percentage of animals could have been treated successfully with serum if the earlier visible signs of infection were more striking. Also because of the impossibility of watching the animals twenty-four hours a day in some cases animals failed to receive serum as soon as visible signs of infection appeared. Owing to these facts, as our protocols show, animals were sometimes treated only after onset of paralysis or even when they were moribund. Most of the animals treated when completely prostrated died.

Proof that specific infection actually existed at the time serum therapy was instituted is supplied by three lines of evidence: The disease continued to progress in some animals, causing death. In other cases the disease progressed for a few hours after serum therapy was begun, and some of the animals appeared to be moribund before recovery began. The histopathologic studies of recovered animals that were killed two and four weeks after recovery demonstrate that widespread damage of the tissues of the central nervous system had occurred but that the inflammatory reaction and destructive changes were receding when the animals were killed. This is confirming evidence that the virus was

TABLE 3.—Summary of Results After Treatment with Hyperimmune Rabbit Serum

Experiment Number and Animals Used	Treated 48 Hours After Virus Injection	Treated at Onset of Fever	Treated When Visibly Ill	Untreated Controls
1 Swiss mice.....	1/8*	—	—	6/6
2 Swiss mice.....	—	—	3/8	6/6
3 Guinea pigs.....	—	0/4	1/4	4/4
5 Guinea pigs.....	—	1/7	1/6†	5/8
Number dead after treatment.....	1	1	5	—
Total animals used....	8	11	18	24
Per cent recovery after treatment.....	87.5	90.9	72.2	0.0

* Numerator equals the number of animals dead after serum treatment; denominator equals the number of animals used in experiment.

† Not including one delayed death from pericardial hemorrhage.

proliferating in and damaging the brain, and apparently the serum arrested the progress of the infection. Finally, the fact that some of the survivors among the animals treated after onset of symptoms were immune to a subsequent intracerebral injection of virus, whereas those treated earlier were not, indicates that the infection had proceeded far enough to produce an active immunity.

A commercial serum, produced by immunization of horses, which had a potency only about 0.1 per cent as high as that of our rabbit hyperimmune serum, had no beneficial effect on the course of the infection in animals treated after visible signs of the disease appeared. It also failed to protect mice when administered forty-eight hours after injection of virus but was effective when given twenty-four hours after the injection. It is believed that this experiment serves as a good control. Furthermore, it emphasizes the importance of potency and dosage of therapeutic serums.

It is believed that the reason for the success of these studies is that adequate dosage (in terms of antibodies) was employed. The use of rabbit serum, which is believed to have smaller antibody molecules and which probably penetrated to the infected tissues more rapidly, may also have had a favorable influence on the treatment.

Although the number of animals used in these experiments was relatively small, it is believed that the results are significant because of their consistency and because

15. The Pathology Department, Michael Reese Hospital, Chicago, aided in preparing the slides and photomicrographs and in the interpretation of the histopathologic appearances.

they receive strong support from the histopathologic examination and the results of the immunity tests. Further studies are being conducted at this time.

Evidence has been presented from the literature that other virus diseases have been successfully treated with serum. However, as far as we are aware, this is the first instance in which evidence from controlled studies of the successful treatment of a virus disease which causes its chief damage in the central nervous system has been presented.

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VITAMIN DEFICIENCIES IN DIARRHEAL STATES

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CINCINNATI

In the light of present knowledge of nutrition made available by the recent discovery and clinical trial of synthetic vitamins, it is well to appraise the role of disorders other than malnutrition itself which predispose to or precipitate nutritional deficiency syndromes. We know that most deficiency diseases result from a combination of adverse circumstances rather than from a single one. This is well illustrated in cases of so-called secondary deficiencies which follow organic disease. We have been particularly interested in the vitamin B complex factors and in the disease states which result from an inadequacy or complete absence of these factors.

Many circumstances may operate in preventing a person from receiving an optimal amount of the vitamins which he requires. Not only may his intake be inadequate, but his powers of assimilation and utilization of these substances may be impaired. Thus diseases and disorders of the alimentary tract play an important part in the development of deficiency states. The present paper is concerned with the role of chronic diarrhea in the production of such syndromes as pellagra, beriberi and riboflavin deficiency.

The medical literature contains many case reports of vitamin deficiency syndromes which complicated diseases of the alimentary tract. One of the earliest was reported by Rolph,¹ who noted pellagra in a patient with carcinoma of the stomach. Joyce and Seabrook² were the first to call attention to rectal stricture as a forerunner of pellagra. Turner³ too has reported examples of jejunal and ileac stenosis, amebic dysentery and rectovaginal fistula as other gastrointestinal disorders which might eventuate in pellagra. Barnes⁴ recorded a similar complication of chronic ulcerative colitis. Yang and Hu⁵ described a case of beriberi associated with amebic dysentery, ulcerative colitis and operations

shortcircuiting the alimentary canal. Both Strauss⁶ and Stannus⁷ have given comprehensive reviews of the role played by diseases of the intestine in "conditioning" deficiency disease.

MECHANISMS BY WHICH DIARRHEA MAY LEAD TO DEFICIENCY STATES

1. *Increased Loss of Ingested Vitamins.*—(a) In chronic diarrhea the most important loss of vitamins and other food constituents is the direct result of the rapid transit of ingested materials through the alimentary tract. In a number of our patients who developed pellagra, neuritis or cheilosis as a sequel of chronic diarrhea we found that dyes ingested with the food usually appeared in the stool within four hours, and occasionally in less than one hour. It is obvious that this speeding up of intestinal transport does not permit adequate absorption of the food, even if digestion is normal.

(b) In most disorders of the alimentary tract, however, there is a decrease or even absence of some digestive juices so that proper enzymatic attack on the food does not occur.

2. *Decreased Absorption of Vitamins.*—In addition to these primary obstacles there are frequently organic changes in the intestine which may impede absorption. There is evidence to show that many simple sugars, dextrose, galactose and lactose, are not absorbed normally in deficiency states.⁸ It seems probable that the inflamed, scarred or atrophic bowel in chronic diarrhea absorbs poorly.

3. *Impairment of Possible Vitamin Synthesis in the Intestine.*—A consideration not yet studied in man is the possibility that certain vitamins, or even the enzyme systems in which they occur in the body, are formed in the intestine through the agency of bacterial synthesis. It is known that colon bacilli can synthesize nicotinic acid (Knight). In like manner bacteria can form other vitamins from primitive materials containing carbon, nitrogen, hydrogen and oxygen.⁹ There is evidence that sheep normally synthesize several members of the vitamin B complex from simple food elements in the intestine.¹⁰ It is not too novel to suppose that normal bacterial residents in the alimentary canal may play a role in synthesizing vitamins. Whether this is important or not is speculative. In certain infections, notably those of the dysentery bacteria, it is conceivable that the organisms in the intestine use or destroy a large part of the vitamin content of ingested food and leave an inadequate amount for the needs of the host.

4. *Decreased Phosphorylation of Vitamins.*—Phosphorylation of some of the products of digestion ordinarily takes place in the intestinal canal. It is probable that this function is impaired in any diarrhea of long duration.

5. *Additional Factors Leading to Deficiency States in Chronic Diarrhea.*—Individuals with some forms of diarrhea may have a considerable increase in metabolism owing to the fever associated with infection. The advent of cramping pains, anorexia, nausea and vomit-

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ing may put an effective blockade on the very source of supply by reducing the intake of food. Any factor which has previously undermined the nutritional status of an individual will increase his liability to a deficiency syndrome in the event of an outbreak of diarrhea. The relationship of these underlying mechanisms is portrayed in table 1.

TABLE 1.—*Disturbance in Vitamin Balance Leading to Deficiency Diseases in Diarrheal States*

	Decreasing Supply			
	Increased Loss	Decreased Assimilation	Decreased Intake Anorexia Vomiting	Increasing Demand: Increased Metabolism
Stricture and stenosis.	+	±	+	—
Intestinal obstruction.	+	+	+	±
Fistulas.	+	+	±	—
Intestinal parasites.	±	+	—	—
Colitis.	+	+	±	±
Dysentery.	+	+	+	+
Functional diarrhea.	+	±	±	±
Diarrhea or pellagra.	+	+	+	—

ROLE OF THE VITAMIN B COMPLEX IN INTESTINAL FUNCTION

There is much evidence to support the opinion that some of the vitamin B complex factors are important for normal intestinal function in animals. The literature on this problem has been reviewed by Borsook, Dougherty, Gould and Kremers.¹¹ They adduced evidence that many of the chronic digestive complaints in a large series of patients could be relieved by the addition of a dietary supplement containing a high concentration of vitamin B complex factors. Evidence for basic function of thiamine in intestinal motility is not conclusive. In experimental thiamine deficiency, Cowgill¹² observed hypochlorhydria and loss of tone in the gastric musculature. Vorhaus, Williams and Waterman¹³ reported a small series of cases in which constipation was relieved following the administration of large doses of thiamine.

In a study on the effect of an intravenous injection of from 10 to 25 mg. of nicotinic acid, we¹⁴ noted that in four of eight subjects examined under the fluoroscope with barium sulfate in the stomach no change could be demonstrated, but the other four had a definite increase in the depth of the peristaltic concentration rings of the stomach. Two of them had severe cramps associated with generalized increase in gastric tonus, considerable decrease in the size of the stomach, and complete cessation of all gastric movement for a minute. After resumption of gastric activity, the contraction waves rose much higher toward the cardiac end than before the injection and were much deeper than they were prior to the administration of the drug. This observation was extended by Crandall, Chesley, Hansen and Dunbar,¹⁵ who noted hypermotility and irregularity in

the intestinal pattern with areas of atony interrupted by areas indicating spasm in B deficient dogs. They concluded "that the P-P factor (nicotinic acid, nicotinamide or any carboxypyridine derivative capable of replacing these in the diet) is essential to the maintenance of normal gastrointestinal motility and that absence of this factor leads to motor dysfunction of the intestinal tract prior to the appearance of the usually accepted deficiency symptoms." They believed the whole B complex to be more effective than is nicotinic acid alone. Thiamine and riboflavin were inactive under the conditions of their experiment.

Thus it is clear that some elements of the vitamin B complex are of great importance in normal alimentary function. This is again demonstrated in the relief of the diarrhea of endemic pellagra by nicotinic acid. When such a diarrhea is not treated, a pernicious cycle begins. Many other vitamin B complex factors, already poorly supplied by the diet, are lost and diagnostic signs of a deficiency of thiamine or riboflavin may appear. Nicotinic acid usually relieves the diarrhea and with the restoration of normal alimentary function the related deficiencies often clear up if they are not too far advanced.

DIARRHEA IN INFANTS AND CHILDREN

There has been little study of the part played by diarrhea in predisposing infants and children to deficiency diseases. Spies, Walker and Woods¹⁶ have emphasized the frequency of nicotinic acid deficiency in summer diarrhea. Where pellagra is endemic it may be impossible in some cases to determine whether a diarrhea is primarily an infection or a deficiency disease. Diagnostic cutaneous lesions are rare in infants,

TABLE 2.—*One Hundred Cases with Diarrhea Leading to Deficiency Diseases*

	No. of Cases
1. Pellagra (nicotinic acid deficiency).....	36
2. Summer diarrhea in infants and children.....	13
3. Intestinal obstruction (partial), carcinoma of rectum, colon, stomach.....	10
4. Stricture (lymphopathia)*.....	8
5. Bacillary dysentery.....	3
6. Nursing infants whose mothers have diarrhea (pellagra).....	3
7. Sprue.....	2
8. Ulcerative colitis.....	2
9. Intestinal tuberculosis.....	2
10. Gastric neurosis.....	2
11. Thyrotoxicosis.....	2
12. Gastrocolic fistula.....	1
13. Adhesions (postoperative).....	1
14. Food poisoning.....	1
15. Undiagnosed.....	14
Total.....	100

In most cases included above there were additional factors predisposing to deficiency disease. Pregnancy, childbirth or lactation occurred in thirty-three, infections (not included above) twenty-eight, operations fifteen, alcoholism seven, pernicious anemia two, and there were many other factors.

* Five of these patients had a colostomy.

but chemical tests and the therapeutic response leave no doubt that a deficiency of nicotinic acid often dominates the picture. As an interesting corollary on the effect of diarrheal states, we have seen pellagra in three nursing infants whose mothers were on a grossly inadequate diet during pregnancy (table 2). When a diarrhea occurred in the mother, the child developed glossitis and diarrhea which cleared up when the baby was put on a formula with a supplement of nicotinic acid.

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REPORT OF CASES

Because of the complexity of the relationship between chronic diarrheas and vitamin deficiency diseases, several cases will be presented to illustrate different aspects of the problem:

CASE 1.—Pellagra and riboflavin deficiency in a case of rectal stricture. C. D., a Negro woman aged 34, was relieved of the glossitis and diarrhea of pellagra by treatment with nicotinic acid in the Hillman Hospital in the spring of 1938. This was her first attack and followed the prolonged use of liquid petrolatum several times daily to facilitate the bowel movements impeded by a rectal stricture. There was no change in the diet during the period she was followed. Her food intake was never good either in quality or in quantity. She was followed in the clinic during 1939, and another outbreak was controlled with nicotinic acid (300 mg. a day for several weeks). In February 1940 a colostomy was performed for the stricture. The wound was only partially healed when she was seen on April 24. She had a severe cheilosis. She was observed for a period of two weeks, during which the diarrhea persisted unchecked with from five to ten loose stools a day. She was then given paregoric 5 cc. from two to four times a day for five days. The diarrhea was controlled and within two weeks the mouth lesions healed and her weight increased from 98 (44.5 Kg.) to 107 pounds (48.5 Kg.). The operative wound healed. She failed to return for ten days and the diarrhea recurred in severe form. The cheilosis then reappeared and she developed a painful glossitis. These were relieved by riboflavin and nicotinic acid.

A long period of disordered intestinal function occasioned by a rectal stricture and abuse of liquid petrolatum predisposed this patient to the development of pellagra. She was treated successfully with nicotinic acid, but an operation soon precipitated another attack of the disease. Recovery followed the partial restoration of normal bowel function. Later the development of a chronic diarrhea eventuated in a relapse of the cheilosis. The signs of deficiency disease disappeared after the diarrhea was checked by paregoric. When paregoric was stopped, the diarrhea recurred and the lesions once more reappeared. This sequence demonstrates the role of diarrhea in precipitating deficiency diseases. It also shows that, if diarrhea is the prepotent cause of the deficiency state, cure of the diarrhea may relieve the deficiency without other therapy. In this case colostomy reduced the absorbing area of the bowel and decreased the margin of safety, which was already small owing to the poor diet of the patient.

CASE 2.—Riboflavin deficiency relieved with large oral doses of riboflavin while diarrhea continued. A. L., a Negro aged 54, developed a diarrhea in December 1939, which was still present when he was first examined on May 14, 1940, three weeks after admission to the urologic service of the Hillman Hospital. His diet was very meager and his weight had fallen from 140 (63.5 Kg.) to 90 pounds (41 Kg.) in five months. He had a *granulomatous* lesion of the rectum, which had reduced the function of the sphincter. During January he noted a dermatitis of the elbows and legs, which was, however, healing and almost well by May. Pains in his legs and burning and paresthesia of the skin began in February. One week before he was examined, his eyes began to hurt and sores appeared at the angles of the mouth. The patient exhibited a variety of lesions. The pellagrous skin lesion was healed and showed thickened pigmented areas on the elbows, shins and feet. The eyes were inflamed, the scleras muddy and the conjunctival vessels injected, particularly in the circumcorneal area. Photophobia was moderate. There were marked arcus senilis and irregular corneal opacities within this ring. There was an unsustained horizontal nystagmus. The mouth showed fearful caries, snags and gum retraction. The tongue was coated but not unusually red. At both angles of the mouth there were macerated whitish lesions surrounding a shallow fissure. The

pink color of the buccal mucosa spread out over part of the lip which is normally brown and a new line of demarcation appeared. The lips were mottled and there was some cracking and peeling of the superficial layer. There was pain on pressure over the lower part of the legs and the feet and some hyperesthesia of the hands. The knee jerks were very weak and the ankle jerks absent. The heart was regular and a tic-tac rhythm was present. A rectal stricture and granuloma of the penis completed the picture. He was given riboflavin orally, 5 mg. three times daily, for five days during which the diarrhea was not treated. In spite of the continuation of from six to eight bowel movements a day, the cheilosis healed during this period. The conjunctival injection and photophobia disappeared and the patient stated that he felt much improved. Determination made on the riboflavin content of the blood revealed a change from 0.37 to 0.58 microgram per cubic centimeter of whole blood before and four days after treatment was begun.

In this case it was possible to relieve the lesions by fairly large oral doses of crystalline riboflavin even during a continuous diarrhea. After therapy the riboflavin concentration in the blood showed an increase. It seems clear, however, that much of the material given was wasted. It is probable that smaller parenteral doses would have been satisfactory also. His other deficiencies were relieved by nicotinic acid and thiamine.

CASE 3.—Deficiency in "colitis." J. T. M., a white man aged 35, was nervous and high strung. He had a nondescript array of gastric complaints characterized by burning of the stomach, gas, belching, constipation and headache. His diet was barely adequate because he restricted himself owing to his stomach complaints. In February 1939 he had two attacks of "colitis" characterized by a mucous diarrhea, abdominal cramps, tenesmus and some decrease in appetite. These attacks lasted about ten days each. After the second, he began to develop a sore red tongue and cheilosis. He had insomnia, nervousness and considerable burning of the eyes. All signs and symptoms, except for constipation and vague gastric complaints, had cleared up by the end of March, one month after the diarrhea ceased. There were no recurrences of the oral lesions during the remainder of the year. When seen April 10, 1940, he had no sign of any deficiency disease. For experimental purposes he was given thyroid substance (Armour) 1 grain (0.065 Gm.) daily for two weeks and experienced some subjective improvement. The dose then was increased to 2 grains (0.13 Gm.) daily. Sixteen days later he was experiencing an increase in bowel movements to five or more a day. He developed cheilosis and a sore red tongue. Since this study was complicated by an intercurrent cold, the thyroid was discontinued. The lesions cleared up during the next week.

This case, in which the borderline diet provided a perilous margin of safety, reveals that an acute colitis may be the episode which brings out the latent deficiency state. An attempt to produce a diarrhea was successful, and this was followed by an outbreak of glossitis and cheilosis. Whether thyroid acted to increase the metabolism is uncertain but in some other cases in which this treatment was given there was no relapse.

CASE 4.—Failure of vitamin therapy to relieve the diarrhea of advanced ulcerative colitis. M. T., a Negro woman aged 53, was first observed with signs of pellagra in the spring of 1938. Her initial attack occurred in 1924 and there had been several recurrences. Early in March 1938 she developed a diarrhea which, with a few short intermissions, continued until her death. During the spring and early summer of 1939 she was treated with nicotinic acid from 100 to 200 mg. daily and had complete relief of all her symptoms except the diarrhea, which however decreased in severity. She received no treatment during the next fall and winter while the diarrhea continued, and she had from ten to twenty watery stools daily. She was admitted to the Hillman Hospital March 20, 1940, in an extreme state of dehydration and malnutrition. Her weight had fallen from 152 (69 Kg.) to about 75 pounds (34 Kg.) in eight

months. She had a severe glossitis, stomatitis, dermatitis, peripheral neuritis and cheilosis. Laboratory studies revealed red blood cells of 2.7 million, hemoglobin 4.6 Gm., hematocrit 17 mm., serum protein 4.76 with fibrin 0.21, albumin 1.72 and globulin 2.83 Gm. per hundred cubic centimeters. Large intravenous and oral doses of nicotinic acid, thiamine, riboflavin and vitamin B₆ were effective in relieving the signs of glossitis, stomatitis, neuritis and cheilosis, but the diarrhea persisted. A high caloric, high protein diet was given, and repeated transfusions were of no avail as the patient lapsed into a state of vascular collapse. Adrenal cortex extract was given but was of only temporary value. After nineteen days of exceedingly painstaking treatment the patient died. An autopsy revealed an extensive ulcerative colitis with large areas of sloughing, necrosis and gangrene, especially in the sigmoid and rectum. The liver was fatty. No abnormality was seen in the adrenals. There was an early miliary tuberculosis in the peritoneum.

The clinical evidence of pellagra, beriberi and riboflavin deficiency disappeared following large parenteral doses of nicotinic acid, thiamine, vitamin B₆ and riboflavin. The diarrhea, after a short period of improvement, relapsed into the severe type, which persisted until her death. In every case of pellagra in which nicotinic acid has not relieved diarrhea we have found some organic lesion to account for the failure. Many persons with severe diarrhea, if seen early enough, are restored to normal bowel function by nicotinic acid, as was done in this case for a period of time. It seems probable that in this case the initial diarrhea aggravated the deficiency of nicotinic acid. This in turn may have increased diarrhea further and led to a deficiency of thiamine and riboflavin.

TREATMENT

1. *General Measures.*—Whenever diagnostic evidence of a vitamin deficiency disease appears in a patient with chronic diarrhea, it is imperative to institute emergency measures. It is theoretically sound to eliminate the diarrhea at once, but some patients first must be treated for the deficiency state if it is more critical than the underlying disease. In such instances, concentrates (liver extract and brewers' yeast) and crystalline vitamins may be of great value. As soon as the deficiency is controlled, the diarrhea should be investigated and relieved whenever possible.

Absolute rest in bed, preferably in a hospital providing expert nursing and dietary care, is the first requirement. Sedatives, camphorated tincture of opium (paregoric) or preparations of bismuth may be helpful. A high protein, 4,500 caloric diet including frequent supplements of milk and egg nog should be given. Replacements should be made to compensate for any food lost because of excessive vomiting or diarrhea. Solid food should be taken as soon as it can be tolerated. Attention should be paid to restoration of fluid, electrolytes, protein and all other essential substances of which the body may be depleted. In addition to specific therapy with crystalline vitamins, it is well to give concentrates of yeast or liver extract because they contain as yet unidentified factors in the B complex which may be needed.

2. *Specific Therapy—Nicotinic Acid.*—Parenteral injection of nicotinic acid amide should be given as soon as the diagnosis of pellagra is established or even suspected. This compound does not produce flushing, and large doses (250 mg.) may be given intravenously.¹⁷ We attempt to give the patient 1,000 mg. the first

day, 500 mg. daily for a week, and smaller doses thereafter. Repeated small oral doses (100 mg.) are satisfactory if the diarrhea is not severe. Since the exact requirement varies, it is desirable to use large doses. This regimen usually improves the patient to the point where the diet can be taken and a thorough investigation of the cause of the diarrhea is possible.

THIAMINE

Intravenous injections of thiamine hydrochloride, 50 mg. daily in from two to four doses, control the specific deficiency. Smaller doses, from 10 to 25 mg. daily, will control mild cases. If pain is the chief manifestation, it is usually relieved in a spectacular way. Organic changes respond slowly and it may be necessary to continue therapy for many weeks, but results are not encouraging in advanced cases. Wet beriberi is not frequently encountered in chronic diarrheas. Therapy in such cases should include, in addition to thiamine, all the general measures for relief of congestive failure. Digitalis is of little value. Serum protein should be determined to see whether hypoproteinemia is present. If so, it may be corrected by transfusion of blood or plasma if a high protein diet cannot be taken at once.

RIBOFLAVIN

Parenteral injection of from 2 to 5 mg., or ingestion of twice that amount, will relieve most cases. Because of the relative insolubility of riboflavin, oral therapy is usually advised. Cheilosis is an indolent lesion and responds slowly, usually only after several days (from four to seven) of treatment. It has not been demonstrated that a deficiency in riboflavin is fatal to man, but there is no question that the vitamin is of great value in many cases, even when no lesions are present.

VITAMIN B₆

The occasional response to vitamin B₆ among endemic pellagrins suggests that a deficiency of vitamin B₆ may occur in cases of chronic diarrhea. The dose we have used is from 20 to 50 mg. intravenously.

PANTOTHENIC ACID

The indications and dosage for pantothenic acid have not yet been established for human beings.

OTHER VITAMINS

Treatment of deficiencies in vitamins A, C, E and K follows the principles already outlined.

SUMMARY AND CONCLUSIONS

In an area of endemic pellagra, beriberi and riboflavin deficiency we have encountered 100 individuals who developed such syndromes as a complication of chronic diarrhea. This number constitutes about 10 per cent of the patients with deficiency diseases.

Chronic diarrhea predisposes to the development of deficiency syndromes by causing increased loss and decreased absorption of vitamins. If the diarrhea is relieved even without vitamin therapy, the secondary deficiencies usually improve.

In deficiency diseases which occur as sequels of a chronic diarrhea, parenteral injections of crystalline vitamins are essential in proper treatment but do not take the place of a high protein, high caloric diet. Nicotinic acid amide (from 500 to 1,000 mg. daily), thiamine hydrochloride (from 10 to 50 mg. daily) and riboflavin (from 2 to 10 mg. daily) will relieve specific deficiencies in most cases.

17. Bean, W. B., and Spies, T. D.: A Study of the Effects of Nicotinic Acid and Related Pyridine and Pyrazine Compounds on the Temperature of the Skin of Human Beings. *Am. Heart J.* 20: 62 (July) 1940.

THE CLINICAL VALUE OF VITAMIN K

GARNETT CHENEY, M.D.

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As vitamin K has only recently been discovered, and synthetic substances with vitamin K activity are at the present time receiving intensive study, our knowledge as to the clinical value of this vitamin is as yet very limited. Although its effect on the hemorrhagic diathesis in chicks on a vitamin K deficient diet has been fairly well worked out, its therapeutic use with patients is largely an unsolved problem. A few disorders with K deficiency are now well recognized; its relationship to a number of others seems probable, and it is possible that it may be of some importance in certain hemorrhagic conditions which have received little or no study up to the present time. Largely on empirical grounds it has been stated that this vitamin is of no value in a number of conditions in which free bleeding may occur.

Clinical studies have been advanced to some extent by the development of certain laboratory tests indirectly indicating vitamin K deficiency. However, when the vitamin first became available commercially the chief source was an alfalfa extract, although putrefactive bacteria were also utilized, and during this time therapy was considerably limited by the instability of the early products and the cost of their production. More recently a number of synthetic compounds with vitamin K activity have been discovered.¹ These are readily produced and are stable and have made possible the rapid advancement in knowledge during the past year because a larger number of cases could be treated.

Of necessity the early reports dealing with vitamin K deficiency and its clinical management resulted in an incomplete understanding concerning the use of the vitamin and caused it to be tried in a great many conditions in which there was absolutely no positive indication for its administration. Its actual clinical value at present may well be presented under four different headings:

1. Those conditions in which its use is positively indicated.
2. Conditions in which it is probably of value, at least in certain cases.
3. Conditions in which it may possibly prove valuable but have as yet been insufficiently studied.
4. Disorders in which it has proved unsuccessful.

DISORDERS DEFINITELY ASSOCIATED WITH VITAMIN K DEFICIENCY AND WHICH ARE BENEFITED BY VITAMIN K THERAPY

Disorders definitely associated with vitamin K deficiency and which are benefited by vitamin K therapy are relatively rare but have been reasonably well defined. They may be divided into two general groups. In the first there is an absence of bile in the intestinal tract and this interferes with the normal absorption of the fat soluble vitamin K. This is most commonly encountered in cases of obstructive jaundice due to stones, cancer, stricture and the like and may also be present in patients with biliary fistulas and long stand-

ing duodenal drainage.² A similar situation may arise in patients with acute and severe hepatitis, such as an acute yellow atrophy of the liver and in yellow fever when no bile reaches the common duct.

The second important type of disorder in which vitamin K deficiency has been clearly recognized is the hemorrhagic disease of the newborn and the tendency of premature infants to bleed. These conditions are associated with prothrombin deficiency and are rapidly alleviated by vitamin K therapy.³

DISORDERS IN WHICH VITAMIN K DEFICIENCY MAY OCCUR BUT THERAPY IS NOT CONSTANTLY EFFICACIOUS

The group of disorders in which vitamin deficiency may occur but in which treatment is not constantly efficacious may be divided into four types. In the first a nutritional deficiency would depend on a complete lack of food or a lack of food containing vitamin K.⁴ Even under such conditions it is difficult to understand how true K deficiency could occur, as this vitamin is known to be manufactured by putrefactive bacteria constantly present in the intestine. On a similar basis, deficiency might occur from an obstruction in the esophagus or at the pyloric end of the stomach. It would be more likely to develop in an obstruction high in the jejunum, as occasionally occurs in malfunctioning gastro-enterostomies, as not only would food be shut off from entering the intestine but the bile would be lost through regurgitation into the stomach. In such a case with high jejunal obstruction, recently observed, the obstruction was complete for eight days but plasma coagulation tests for K deficiency were constantly normal and no hemorrhagic tendency appeared.

A second type of case in which deficiency might occur would be a disturbance in intestinal absorption, such as might take place in severe diarrhea, ulcerative colitis, dysentery, multiple strictures, fistulas and possibly sprue. Such cases have been reported,⁵ but a hemorrhagic diathesis developing under these conditions is distinctly uncommon. I have studied a number of patients of this type without yet encountering any in which K therapy seemed indicated. A case of sprue recently observed is a good example (chart 1). The patient never showed any hemorrhagic tendency or clinical benefit from vitamin K therapy, although his prothrombin time (Quick) was prolonged and was reduced by treatment. The blood and plasma coagulation times remained unaltered.

A third type of case in which deficiency might occur is that in which the liver has been damaged by cirrhosis or chronic hepatitis. Such damage would interfere with the utilization of the vitamin and may in certain instances lead to uncontrollable hemorrhage.⁶ This

2. Snell, A. M.: Symposium on Hemorrhagic Diathesis in Cases of Jaundice: Relation to Vitamin Deficiency; Preliminary Report, Proc. Staff Meet., Mayo Clin. 13: 65 (Feb. 2) 1938; Vitamin K: Its Properties, Distribution and Clinical Importance, J. A. M. A. 112: 1457 (April 15) 1939. Butt, Snell and Osterberg.⁶ Clark, Dixon, Butt and Snell.³

3. Wardell, W. W., Jr., and Du Pont, Guerry III: Effect of Vitamin K on the Clotting Time of the Prothrombin and the Blood, J. A. M. A. 112: 2259-2263 (June 3) 1939. Dam, Henrik, Tace-Hansen, E., and Plum, P.: Vitamin K Lack in Normal and Sick Infants, Lancet 2: 1157-1161 (Dec. 2) 1939.

4. Kark, Robert, and Lozner, E. L.: Nutritional Deficiency of Vitamin K in Man, Lancet 2: 1162 (Dec. 2) 1939.

5. Clark, R. L., Jr., Dixon, C. F., Butt, H. R., and Snell, A. M.: Deficiency of Prothrombin Associated with Various Intestinal Disorders: Its Treatment with the Antihemorrhagic Vitamin (Vitamin K), Proc. Staff Meet., Mayo Clin. 14: 407-416 (June 28) 1939.

6. Butt, H. R., Snell, A. M., and Osterberg, A. E.: Further Observations on the Use of Vitamin K in the Prevention and Control of the Hemorrhagic Diathesis in Cases of Jaundice, Proc. Staff Meet., Mayo Clin. 13: 753 (Nov. 30) 1938. Pohle, F. J., and Stewart, J. K.: A Study of the Quick Method for the Quantitative Determination of Prothrombin with Suggested Modifications, Am. J. M. Sc. 108: 622 (Nov.) 1939.

From the Department of Medicine, Stanford University Medical School.

Read before the Section on Gastro-Enterology and Proctology at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

1. Snell, Albert M., and Butt, Hugh R.: Supplementary Report on Vitamin K, J. A. M. A. 112: 2056 (Dec. 2) 1939.

situation must be relatively uncommon, as I have encountered it only once in a series of fifty-two cases showing evidence of hepatitis and biliary tract disease. This incidence is similar to that reported by Quick⁷ in 1938. In those unusual instances when free bleeding occurs basically as the result of disturbed liver function

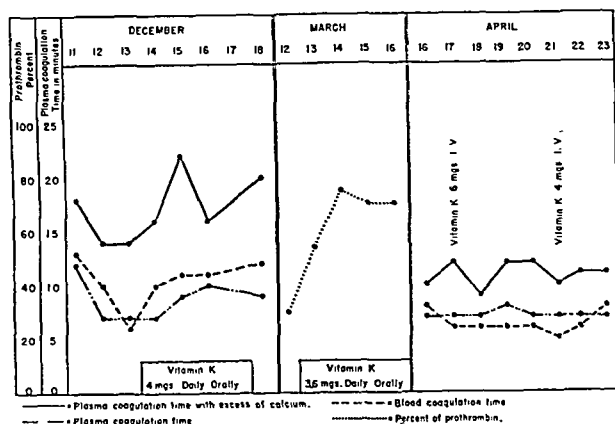


Chart 1.—Effect of vitamin K therapy in a case of nontropical sprue without any bleeding tendency. Prothrombin percentage (Quick) increased but clinical condition and blood and plasma coagulation times unaltered.

it seems unlikely that the administration of vitamin K would be effective even by the parenteral route. Such a lack of effectiveness has already been reported.⁸

A fourth type of patient in which mild K deficiency may be present and in whom it would be important to administer the vitamin is the expectant mother. A series of fifteen cases of pregnant women has already been reported⁹ who have been treated with vitamin K before delivery; and it is implied that their offspring are less likely to bleed after birth when the mothers are so prepared. This work needs further confirmation.

CONDITIONS IN WHICH VITAMIN K DEFICIENCY MAY OCCUR AND THERAPY MAY BE BENEFICIAL BUT WHICH HAVE BEEN INSUFFICIENTLY STUDIED

A number of interesting clinical problems has been encountered which may be grouped under conditions in which vitamin K deficiency may occur and in which treatment may be beneficial but which have been insufficiently studied. The first concerns those cases in which deficient absorption of fat may occur which might interfere with the transportation of the vitamin through the intestinal wall. This might take place on a fat deficiency diet or might be due to disturbances in fat metabolism such as occur in cases of sprue and celiac disease and occasionally in pancreatic disorders. Also the proper absorption of fat and the vitamin might be interfered with in cases of biliary tract disease without common duct obstruction, as has been pointed out by Smith,¹⁰ and a case of gallbladder disease has recently been reported in which such a mechanism could have been responsible for the prolonged plasma coagulation

times which were encountered.¹¹ As certain forms of synthetic vitamin K are water soluble, their absorption would not be affected by a disturbance in fat metabolism, but it has not yet been shown that they naturally occur in a human diet.

A second group of cases which has received no attention in the literature to date is that which includes nephritis, hypertension and uremia, particularly when the late but not uncommon tendency to skin and mucous membrane hemorrhages is present. Three such cases have recently been encountered in which bleeding ceased coincident with vitamin K therapy. The effect of the treatment in one of these cases is shown in chart 2. This patient clinically showed purpura and epistaxis, and plasma coagulation time tests were slightly above normal. Bleeding ceased coincident with parenteral vitamin K therapy and the coagulation times were reduced to less than a normal average. It must be recognized that these results in this small group of cases may be purely coincidence, but they indicate that this type of problem deserves further study.

A most interesting problem is the possibility of reducing the blood and plasma coagulation times of a presumably normal person to a minimum of one or two minutes by the administration of vitamin K orally or parenterally. Six individuals without evidence of any organic disease have recently been studied from this point of view. In four of these the coagulation times of the blood and plasma were significantly reduced. The observations on one young woman with a mild psychoneurosis are shown in chart 3. She received vitamin K by mouth and a reduction in the rate of blood and plasma coagulation took place. Here again, as in the group of patients with renal disorders, the series is altogether too small from which to draw any definite conclusions, but it serves to stimulate further interest in apparently normal patients who may have subclinical K hypovitaminosis.

The observation that patients with definite vitamin K deficiency when successfully treated may show a reduction in their plasma coagulation time to less than the normal average when on adequate therapy and the possibility that the blood and plasma coagulation times

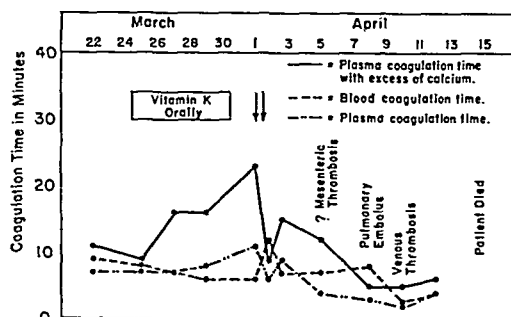


Chart 2.—Effect of vitamin K therapy in a case of malignant hypertension and uremia with purpura and epistaxis. Bleeding ceased and blood and plasma coagulation times reduced. Venous thrombosis developed. Arrows indicate single intramuscular injection of 2 mg. of vitamin K.

of normal patients may be reduced by similar treatment suggest the desirability of studying the effect of administering vitamin K preoperatively to patients in whom postoperative bleeding is to be avoided. Theoretically at least an improvement in the coagulability

7. Quick, A. J.: The Nature of the Bleeding in Jaundice, J. A. M. A. 110:1658 (May 14) 1938.

8. Andrus, W. DeW., and Lord, J. W.: Correction of Prothrombin Deficiencies, J. A. M. A. 114:1336 (April 6) 1940. Aggeler, P. M.; Lucia, S. P., and Goldman, Leon: Effect of Synthetic Vitamin K Compounds on Prothrombin Concentration in Man, Proc. Soc. Exper. Biol. & Med. 42:689 (April) 1940. Butt, Snell and Hellman, L. M.: Factors

9. Shettles, L. B.; Delfs, Eleanor, and Osterberg, A.: Influencing Plasma Prothrombin in Newborn Infant: Antepartum and Neonatal Ingestion of Vitamin K Concentrate, Bull. Johns Hopkins Hosp. 65:419 (Nov.) 1939.

10. Smith, H. P., in discussion on Stewart, J. D., and Rourke, G. M.: Control of Prothrombin Deficiency in Obstructive Jaundice, J. A. M. A. 113:2223 (Dec. 16) 1939.

11. Cheney, Garnett: Vitamin K Deficiency in a Case of Gallbladder Disease Without Clinical Jaundice or Hepatitis, Am. J. Digest. Dis., to be published.

of the blood might lessen the tendency to postoperative bleeding, which is particularly disturbing following operations on the eye and on the prostate. This is a field which has not yet been explored.

HEMORRHAGIC CONDITIONS IN WHICH VITAMIN K HAS BEEN SHOWN TO BE INEFFECTIVE

One of the first diseases to be studied in respect to vitamin K deficiency was hemophilia. Although the blood coagulation defect in hemophilia is very similar to experimental vitamin K deficiency in fowls, it is apparently not identical and attempts to improve the blood clotting in hemophiliac patients have met with failure. Recently I have tried repeated injections of the newer synthetic vitamin K preparations without any very encouraging results. Its use in various types of purpura whether primary and thrombocytopenic or secondary to aplastic and myelophthisic anemia or to leukemias and sepsis has proved unavailing. Such an instance is illustrated in chart 4. The patient had aplastic anemia with an almost complete absence of platelets from the blood, and skin and mucous membrane bleeding. Oral and intravenous vitamin K therapy were ineffective. Anaphylactic purpura is like-

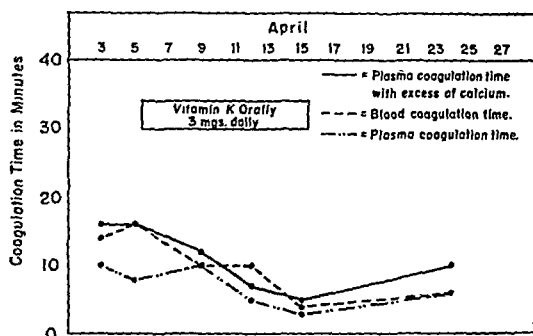


Chart 3.—Effect of vitamin K therapy on the normal coagulation times of the blood and plasma of a psychoneurotic patient on an adequate diet. Pronounced reduction occurred on the sixth day.

wise not benefited by vitamin K therapy. This lack of success was to be expected, as these purpuric conditions are not associated with disturbances in the soluble globulin of the blood. The use of vitamin K to control blood loss from the nose, esophageal varices, gastric and duodenal ulcers, the colon, hemorrhoids and the uterus has been without proved success to date.

TESTS FOR VITAMIN K DEFICIENCY

The simplest and most certain evidence of vitamin K deficiency is the presence of hemorrhage in a patient with intense jaundice of the obstructive type and in the newborn infant. While laboratory tests are of confirmatory value, such clinical manifestations are a definite indication for immediate vitamin K therapy.

Tests of so-called prothrombin time as devised by Quick¹² and by Ziffren and his co-workers¹³ have been widely used and show a reduction in the thermolabile globulin of the blood which is associated with vitamin K deficiency. An increase in these globulins occurs coincident with vitamin K therapy. They represent an indirect test for the deficiency and have proved of

inestimable value in determining the rest in the relationship of the of liver disease due to a lack of vitamin K. However, they present certain drawbacks which have tended to limit their usefulness. A technical disadvantage is that an unstable tissue extract must be used for the test and

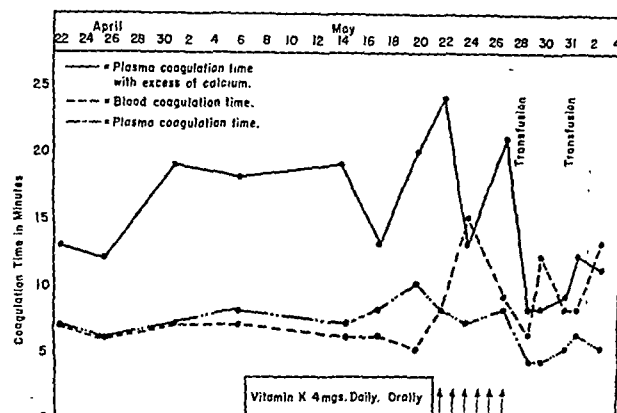


Chart 4.—Lack of effectiveness of vitamin K therapy in a case of skin and mucous membrane hemorrhages and thrombocytopenic purpura due to aplastic anemia. The bleeding was not controlled and the blood and plasma coagulation times were not reduced. Each arrow indicates an intravenous injection of 2 mg. of vitamin K.

such an extract is not readily available except in large medical centers where trained technicians are constantly performing the tests. A second drawback is the fact that the reduction in so-called prothrombin may indicate a deficiency of vitamin K but is not necessarily indicative of a hemorrhagic tendency. If the little known substances in the blood which tend to retard blood coagulation are also diminished in proportion to those which tend to accelerate coagulation, and there is no disturbance of the balance between the two,

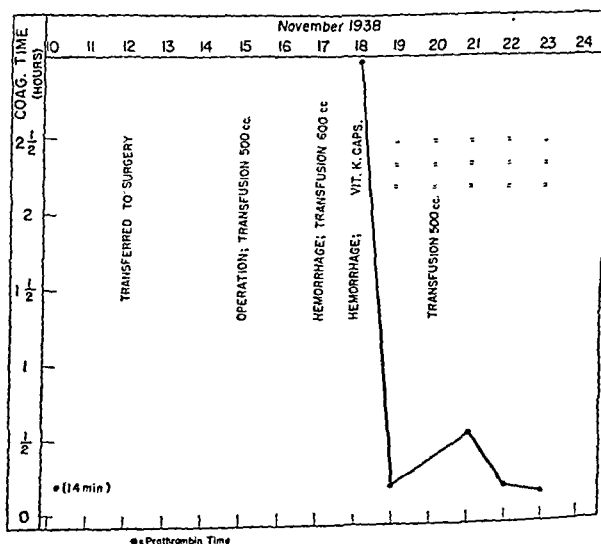


Chart 5.—Dramatic effect of vitamin K therapy in surgical case of obstructive jaundice with massive hemorrhage. Bleeding ceased and the plasma coagulation time was rapidly reduced.

the patient is no more likely to bleed than if the blood contained larger amounts of both these substances. Theoretically at least there is a third drawback in that vascular thrombosis may be produced in a patient with a diminished amount of clot promoting substances but with a normal ratio with the anticoagulation substances. Raising "the prothrombin level" under such conditions.

12. Quick, A. J.; Stanley-Brown, Margaret, and Bancroft, F. W.: A Study of the Coagulation Defect in Hemophilia and in Jaundice, *Am. J. M. Sc.* 190: 501-511 (Oct.) 1935.

13. Ziffren, S. E.; Owen, C. A.; Hoffman, G. R., and Smith, H. P.: Control of Vitamin K Therapy: Compensatory Mechanisms at Low Prothrombin Levels, *Proc. Soc. Exper. Biol. & Med.* 40: 595-597 (April) 1939.

which are often present in cirrhosis of the liver, might so reduce the blood and plasma coagulation times as to precipitate intravascular clotting. Three patients with extensive venous thromboses have been studied in whom these coagulation times were unusually short. One of these was the patient with hypertension and uremia (chart 2). It is, of course, possible that the thromboses in this patient were coincidental, but it must be noted that they occurred parallel with the shortening of the coagulation times.

The plasma coagulation time which is a modification of Howell's prothrombin time¹⁴ has shown certain advantages. It has been employed in following experimental vitamin K deficiency in chicks and has proved satisfactory in the research laboratory.¹⁴ It is a simple test, requiring but two standard chemical solutions and no unstable tissue extracts. It does not indicate a diminution of thermolabile globulin substance but a loss of balance between the clot retarding substances and the clot promoting substances, which is the real basis for the hemorrhagic defect. It may indicate a tendency toward vascular thrombosis which has already been noted. The test is not affected by platelet deficiency as ordinarily encountered in thrombocytopenic purpura. Normal coagulation times for this test are from two to eight minutes when an optimum amount of calcium is added and from three to fifteen when an excess of calcium is used.

A "serum volume test"¹⁵ has been developed as a simple test to detect vitamin K deficiency. It has not proved serviceable in a small number of cases which I have studied.

THE THERAPEUTIC USE OF VITAMIN K

In those conditions in which vitamin K deficiency is associated with an absence of bile in the intestinal tract, the administration of bile salts alone to the patient may be all that is necessary as they will promote absorption of the vitamin. From 1 to 3 Gm. daily is adequate. It is useless to administer the vitamin in this type of case without the addition of bile salts unless a water soluble form is used. Vitamin K may be administered in a number of ways. Certain foods, notably green vegetables such as cabbage and spinach, are an excellent source, and canned mixed greens may be used in the same manner. A product of proved value¹⁶ is made of the stalks of green grasses¹⁷ and is effective in doses of from twelve to twenty-four tablets daily or from 3 to 6 teaspoons daily.

Medicinal products are of two types. One is an extract of alfalfa and contains the fat soluble natural vitamin. The other represents a group of synthetic products which are more or less effective, the base being naphthoquinone.¹

The choice of a preparation may be important. As far as is known at present, vitamin K from natural sources has no definite advantage over the synthetic products which are of equal potency. Food sources are desirable in that they are cheap, and cerophyl is in the same category. They usually supply an excess of the vitamin when given in usual amounts but no standardization of dosage is available. The alfalfa

extract has been available for some time and is highly effective but is more costly than the synthetic products, which have the advantage of being cheap, well standardized and in certain instances water soluble, which makes some of them suitable for hypodermic injection. Parenteral therapy is more desirable than oral therapy in the treatment of infants, of patients who are vomiting and of patients in whom severe hemorrhage makes rapid control desirable. While this vitamin may be quite effective by mouth in from six to twelve hours, it is more rapidly effective by injection.¹⁴ An average therapeutic dose of natural vitamin K or of 2-methyl-1, 4-naphthoquinone is from 2 to 4 mg. daily two days before and seven days after operation. Therapy must be continued indefinitely in cases in which the cause of the deficiency cannot be relieved.

The success of treatment depends on the accuracy of diagnosis as indicated both by the clinical data and by the laboratory observations. In that group of cases in which K deficiency is known to be present the results of therapy represent an outstanding achievement in recent medical research and, in certain instances of otherwise fatal hemorrhage, may prove life saving. This is well illustrated by the case shown in chart 5. Severe postoperative bleeding was occurring subsequent to an operation on the biliary tract, and the plasma coagulation time was greatly prolonged. The hemorrhage was rapidly controlled by adequate bile salt and vitamin K therapy by mouth. Its effect on prolonged prothrombin times and on the prolonged plasma coagulation times is striking and offers a useful laboratory check on the results of the medication. However, it must be borne in mind that, treating a prolonged prothrombin time is not necessarily important clinically, as it may not indicate that a hemorrhagic tendency is present. Actually, a true, clearcut deficiency of vitamin K is rarely encountered.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. BEAN AND SPIES AND DR. CHENEY

DR. THOMAS T. MACKIE, New York: I agree with Dr. Bean and Dr. Spies with one possible reservation—the implication that the deficiency syndromes occurring in diarrheal states are commonly due to increased loss resulting from intestinal hypermotility. In my experience the rate of forward progress of the barium sulfate-water meal is rarely increased above normal and is frequently slower than normal. The roentgenologic changes demonstrable in the small intestine in deficiency disease have been shown to be associated with delayed absorption of substances such as dextrose and potassium iodide. It is probable that they contribute to progressing deficiency. As the authors have pointed out, it is important to appreciate that a major surgical procedure may precipitate an acute deficiency state. Dr. Cheney's paper is in complete conflict with the current literature on vitamin K. Data published by the Mayo Clinic group, by Quick, by Smith and by other leading authorities on the subject show conclusively that the coagulation time is not a measurement of the vitamin K status. In the presence of a normal coagulation time prothrombin deficiency may already be in the danger zone to such a degree that bleeding may occur and the patient actually die from hemorrhage before the coagulation test demonstrates any deficiency whatever. Determination of the prothrombin time or quantitative estimation of prothrombin constitutes the only direct measurement of vitamin K deficiency available at the present time. It has been amply shown that the function of vitamin K is the maintenance and activation of prothrombin, probably through the action of normal liver. Normal blood of man and animals has a prothrombin content far in excess of the amount needed for normal blood coagulation. This natural "hyperprothrombinemia" appears to be physiologic. No data are available to show that vitamin K

14. Cheney, Garnett: The Plasma Coagulation Time as a Simple Test for Vitamin K Deficiency, *Am. J. M. Sc.*, to be published.

15. Boyce, F. F., and McFetridge, E. M.: Serum Volume Test for Hemorrhagic Diathesis in Jaundice: Further Observations, *New Orleans M. & S. J.* 91: 357 (Jan.) 1939.

16. Cerophyl manufactured by the Cerophyl Laboratories, Kansas City, Mo.

17. Rhoads, J. E.: The Relation of Vitamin K to the Hemorrhagic Tendency in Obstructive Jaundice with a Report on Cerophyl as a Source of Vitamin K, *Surgery* 5: 794 (May) 1939.

may induce an abnormally high prothrombin level. If the orthodox theory of blood coagulation is correct, intravascular clotting cannot be produced by vitamin K, and hyperprothrombinemia has not been observed in thrombosis. Furthermore the blood clotting test which Dr. Cheney has used is not a measure of a pathologic condition even in the presence of thrombosis.

DR. DONALD T. CHAMBERLIN, Boston: My experience with avitaminosis has been in the dietary management of postoperative cases, particularly those following subtotal gastric resection. Following resection, one finds the beefy, rough, sharp-pointed tongue, usually heavily furred, dry mouth and skin, sometimes diarrhea when feeding is begun on the fourth or fifth postoperative day, and usually irritability and occasionally neuritides, though the latter are rare. Formerly these symptoms were thought to be the result of the procedures or of dehydration or both; however, the early improvement resulting from the use of parenteral vitamin B in the form of crude liver extract, or injectable vitamin B complex, makes the diagnosis of vitamin deficiency in these cases certain. My custom has been to start liver injections or vitamin B complex injections, or both, on the second or third day. I have found that by the eighth or tenth day the clinical signs of vitamin deficiency have largely disappeared, the tongue is flat, clean, pink and moist, the eye is bright and the skin warm and moist. I have not noticed any increase in the healing rate of the wound. The loss of vitamins through the digestive tract in diarrheal states is undoubtedly large but difficult to measure and to evaluate. If the diarrhea is the result of a general change in the entire digestive tract there is a greater loss of the fat-soluble vitamins as well as the water-soluble ones than when the lesion, such as ulcerative colitis, involves only the colon, and the absorptive powers of the small intestine are intact. In general, patients with diarrhea who receive additional vitamins improve in appetite and physical well being; however, except in the case of diarrhea as a symptom of primary vitamin deficiency, other measures must be used to check the diarrhea. In my experience diarrhea as a symptom of primary vitamin deficiency has been rare. The points requiring emphasis in the use of Vitamin K are these: 1. In severe liver damage and in such conditions in which fat metabolism is disturbed, as sprue, the prothrombin level may not be appreciably raised or, if raised, may not stay up. 2. It is of the utmost importance to raise the prothrombin level as high as possible and not be satisfied with levels from 70 to 85 per cent of normal, before contemplated operative procedures are carried out. 3. If the level cannot be raised, bleeding must be expected postoperatively.

DR. MANDREB W. COMFORT, Rochester, Minn.: May I join Dr. Mackie in emphasizing the fact that hypoprothrombinemia occurs in four major conditions: (1) inadequate intake of food containing vitamin K, (2) impairment of absorption referable to lack of bile in the intestine, (3) impairment of absorption caused by deficient absorptive surfaces and (4) hepatic insufficiency preventing the utilization of vitamin K. Hypoprothrombinemia, as well as the resulting tendency toward hemorrhage, has been encountered in a variety of diseases or conditions, including obstructive jaundice, sprue, intestinal obstruction, short-circuiting operations such as gastro-ileostomy which reduce the absorptive surfaces of the small bowel, and hepatic diseases of various types. Hypoprothrombinemia plus the associated hemorrhagic tendency has responded satisfactorily to preparations of vitamin K derived both from alfalfa and from fish meal; it has also responded to the synthetic preparations, which are administered orally and parenterally. Toxic reactions have not occurred. The decrease in the prothrombin clotting time (the laboratory measurement of the degree of hypoprothrombinemia present), as well as the cessation of bleeding, occurs within a few hours. The preparations of vitamin K thus far used have been ineffectual in reducing the prothrombin clotting time and in stopping hemorrhage only in cases of advanced disease of the liver, chiefly cirrhosis. The failures in the early use of vitamin K have largely been eliminated by the prescription of adequate dosage in prophylactic and curative therapy and by the use of preparations to be administered intravenously.

DR. JOHN L. KANTOR, New York: There are two points I should like to make. One is a plea to Dr. Bean and his collaborators to simplify the nomenclature of the dosage of the vitamins. It is confusing to have two or three different kinds

of nomenclature, international units, Sherman units and micrograms, to carry in mind. Now that we have crystalline products available, wouldn't it be a great help to all of us to have the dosage recorded in milligrams? It would simplify administration and make for clarity in the use of these important substances. My second point is directed toward Dr. Cheney. He has apparently not yet encountered a hemorrhage in the case of deficient intestinal absorption. This possibility was already stressed by Dr. Mackie. I should like to call attention to a brief discussion of hemorrhage in the sprue type of defective intestinal absorption published in the May issue of the *Archives of Internal Medicine*. When bleeding does occur it may be very serious indeed. At present it is a great comfort to know that the administration of vitamin K will control the symptoms, not only the massive hemorrhages in the intestinal tract but also those in the skin. A word of caution: If the vitamin K is administered by mouth it is usually in a fat medium which cannot be absorbed; it is therefore important to give it in a water-soluble medium, either by mouth or parenterally, so that it can be absorbed in these cases of deficient fat utilization.

DR. WILLIAM BENNETT BEAN, Cincinnati: In answer to Dr. Mackie's statements about intestinal motility in diarrheal states, in many of our cases there was advanced organic disease of the colon or ileum as seen at postmortem. We have given dyes or glass beads, which occasionally appeared in the stool within an hour but were usually apparent between four and six hours contrary to his experience when using barium. In these cases we found particles of undigested food, so this rapidity of transit through the alimentary canal was a factor leading to vitamin deficiency. Whether that is generally so in cases of uncomplicated diarrheas due to deficiency disease I don't know, but in cases of definite organic disease it was a factor. The indications for vitamin B₁₂ are difficult to predict with certainty. The patients whom we have successfully treated were endemic pellagrins or beriberi patients who had been given large doses of nicotinic acid, thiamine hydrochloride and riboflavin and who, following each of these materials, had an increased feeling of well being and relief of specific symptoms and yet were still not completely well. Their complaints were ataxia, difficulty in walking, muscular weakness, nystagmus, pains in the epigastrium and inability to work. Their diets during the time were grossly deficient. When large doses of vitamin B₁₂ were given, some of the patients got dramatic response but some were not specifically helped. It was impossible to predict which would be helped. It was definite that certain ones were able to get up and walk and had a definite feeling of well being, lost the nystagmus and ataxia and were able to perform muscular movements previously impossible. As far as operations go, when dextrose is given in large amounts to any individual in a borderline state of nutrition it is very likely to precipitate a crisis of deficiency disease, and one method to control experimental therapy is to put the patient to bed and give nothing but dextrose and water by mouth. This may be a factor in several postoperative complications. We have a feeling that there will come a time when physicians will cover such administrations of dextrose with B complex vitamins, as is now done with insulin. Dr. Kantor's question regarding dosage is exceedingly important. It is illogical to talk in terms of units derived from assays of impure materials when we have pure chemical substances which can be weighed. Calculations should be made in terms of grams, milligrams and micrograms.

DR. GARNETT CHENEY, San Francisco: I can best answer most of the points that Dr. Mackie raised that were contrary to what I presented by saying this: First, he seems to be about where we were two years ago when we relied on prothrombin determinations alone for our study of vitamin K deficiencies. Second, I can't help but believe that Dr. Mackie has not studied this disease in clinics for a long period, as we have. That goes over a five year period. As long as he relies on so-called quantitative prothrombin—and nobody knows what that is—determinations on which to base his whole classification of K deficiency, I believe we are not talking on the same level; consequently I can't go into that any further with the time allotted to me. I am familiar with bleeding in sprue. I simply stated that we had not seen it, and I cannot help but feel that a laboratory test such as the prothrombin time, which is notoriously unreliable even in the hands of skilled workers, cannot be accepted

as the final word in determining vitamin K deficiency; and I am familiar with the fact that a number of others agree with that. I was rather hasty with regard to dosage and therapy. It has been our habit to give 2 mg. a day or more. We have given it parenterally. The slides I went over showed the rapid response in vitamin K deficiency and obstructive jaundice to therapy. The patient with gallbladder disease received three injections in twenty-four hours with a reduction in time within a matter of hours which showed clearly on the chart, but I did not have time to emphasize that point. I certainly didn't mean to give the impression that vitamin K was not highly efficacious in the type of case in which it should be given. I think its use represents one of the most important recent advances in medical treatment and I am sorry if I gave any impression to the contrary. I did want to emphasize that I think its use must be limited to definite groups of cases and, as long as we treat and just use a laboratory test such as prothrombin time, we may treat some patients unnecessarily.

THE INFLUENCE OF THE LIVER ON THE UTILIZATION OF VITAMIN K

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It is now well established that proper administration of vitamin K and related compounds will in most instances prevent or control hemorrhage resulting from a deficiency of prothrombin. It has been reported also that administration of these substances is less effective when the prothrombin deficiency is associated with extensive hepatic damage (Smith, Warner and Brinkhous,¹ Warner,² Butt, Snell and Osterberg,³ Stewart and Rourke,⁴ Pohle and Stewart⁵).

The present study was undertaken to determine any possible correlation between the condition of the liver, the occurrence of a deficiency of prothrombin and the subsequent utilization of vitamin K. Hepatic damage was produced by uniform exposure of rats to a known concentration of carbon tetrachloride. The susceptibility of the liver of these animals to carbon tetrachloride was varied by the use of different dietary levels of carbohydrate, protein and fat. Crude concentrates of alfalfa and 2-methyl-1, 4-naphthoquinone were administered to some of these animals and in all instances failed to increase the level of prothrombin in the circulating blood. A detailed study was made also of the possible causes of these failures. The only common factor found was that extensive hepatic injury was associated with depletion of the level of prothrombin and also with failure of response to vitamin K.

From the Division of Experimental Medicine, the Mayo Foundation (Dr. Bollman), and the Division of Medicine, the Mayo Clinic (Dr. Butt and Dr. Snell).

Read before the Section on Pathology and Physiology at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

1. Smith, H. P.; Warner, E. D., and Brinkhous, K. M.: Prothrombin Deficiency and the Bleeding Tendency in Liver Injury (Chloroform Intoxication), *J. Exper. Med.* **66**: 801-811 (Dec.) 1937.

2. Warner, E. D., in discussion on Butt, H. R.; Snell, A. M., and Osterberg, A. E.: Oral and Intramuscular Administration of Vitamin K in Hemorrhagic Diathesis of Obstructive Jaundice, *abstr. J. A. M. A.* **112**: 879-880 (March 4) 1939.

3. Butt, H. R.; Snell, A. M., and Osterberg, A. E.: The Preoperative and Postoperative Administration of Vitamin K to Patients Having Jaundice, *J. A. M. A.* **113**: 383-389 (July 29) 1939.

4. Stewart, J. D., and Rourke, G. M.: Control of Prothrombin Deficiency in Obstructive Jaundice by Use of Vitamin K, *J. A. M. A.* **113**: 2223-2227 (Dec. 16) 1939.

5. Pohle, F. J., and Stewart, J. K.: Observations on the Plasma Prothrombin and the Effects of Vitamin K in Patients with Liver or Biliary Tract Disease, *J. Clin. Investigation* **19**: 365-372 (March) 1940.

EXPERIMENTAL PROCEDURE

Male white rats (Wistar strain) weighing approximately 200 Gm. each were fed a basic diet which consisted of 44 parts of lean meat, 44 parts of cracker meal, 8 parts of lard and 4 parts of salt mixture and vitamin supplement. Normal rats take 20 Gm. of this diet daily. The rats used in this experiment were kept in individual cages and the uneaten portion of the food was reweighed each day. The mixed diet was fed in 20 Gm. amounts; carbohydrate diet consisted of 10 Gm. of the mixed diet and 7 Gm. of cracker meal; the protein diet was 10 Gm. of the mixed diet and 10 Gm. of lean meat; the fat diet was 10 Gm. of the mixed diet and 3 Gm. of lard. The amounts thus fed were isocaloric. All animals were given the experimental diet for from five to seven days prior to exposure to carbon tetrachloride.

The rats were placed in a closed chamber and exposed to carbon tetrachloride vapor for thirty minutes three times each week as long as the animals survived. The concentration of carbon tetrachloride vapor was uniformly maintained by vaporizing 1 cc. of carbon tetrachloride in 10 liters of air passed through the chamber each minute. The rats were semiconscious at the end of each exposure but recovered rapidly when returned to their cages in air.

EXPERIMENTAL RESULTS

All of the rats that died as a result of the repeated administration of carbon tetrachloride were found to have massive accumulation of blood in the gastrointestinal tract. Many animals gave evidence of intestinal bleeding several days before death. Tarry stools were noted and in many animals signs of anemia were also present. Blood taken at this time usually showed delayed clotting time and in all cases the prothrombin level was found to be less than 30 per cent of the normal value (Quick⁶). Other animals taken before signs of hemorrhage were evident usually showed normal clotting time of the blood but some reduction of the prothrombin content. No definite time relationship was found between the duration of the carbon tetrachloride regimen and the time of reduction of the prothrombin. Usually the changes were not present until the third week but there were numerous exceptions both earlier and later.

The addition of vitamin K concentrates (from 1,000 to 5,000 Dann units daily) to the diet had no influence on the survival time of the rats that received carbon tetrachloride, nor did the further addition of bile salts to the diet show any influence on the occurrence of hemorrhage. Intramuscular injections of vitamin K concentrates, both in water and in oil, were likewise ineffective, as was the oral and subcutaneous administration of 2 mg. daily of 2-methyl-1, 4-naphthoquinone. Likewise the administration of vitamin K proved ineffective in increasing the prothrombin content of the blood of rats found deficient in prothrombin following continued administration of carbon tetrachloride. When administration of carbon tetrachloride was discontinued to animals found deficient in prothrombin, normal amounts of prothrombin were found in from seven to ten days. No definite acceleration of prothrombin formation was found in similar animals which were given large amounts of vitamin K.

Although gross hemorrhage into the intestine was a prominent feature in the condition found at necropsy,

6. Quick, A. J.: The Clinical Application of the Hippuric Acid and the Prothrombin Tests, *Am. J. Clin. Path.* **10**: 222-233 (March) 1940.

microscopic examination of sections from the intestine did not show any evidence of bleeding from large vessels. Petechial hemorrhages were observed in the capillaries of the mucosa in all animals. In many these were confined to the capillaries of the villi of the jejunum, but in others bleeding from almost all of the mucosal capillaries was observed. In a few animals petechial hemorrhages were also observed throughout the entire gastrointestinal tract including the stomach and colon. The greatest changes were always found in the jejunal portion, however. A typical picture of capillary hemorrhage in a jejunal villus is shown in figure 1. Capillary hemorrhage was also frequently found in other organs to a lesser degree than in the intestine. Listed in order of the magnitude of the bleeding observed microscopically, these organs are the liver, kidney, lung, adrenal and pancreas. A few petechial hemorrhages were found occasionally in the heart and skeletal muscle. Because this pathologic change seemed similar to that reported by Griffith and

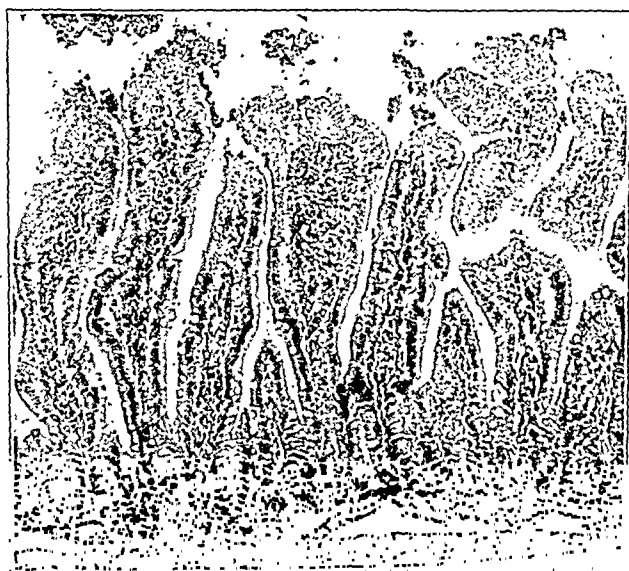


Fig. 1.—Typical capillary hemorrhage in a jejunal villus of a rat that died after thirty-four days of the carbon tetrachloride regimen; $\times 100$.

Wade⁷ in young rats on a choline-deficient diet, we added 20 mg. of choline daily to the diet of a series of rats receiving carbon tetrachloride. This addition, however, proved ineffective in preventing or delaying the occurrence of hemorrhage in our rats.

The only organ that showed cellular degeneration other than that immediately associated with hemorrhage at the time of death from bleeding after the carbon tetrachloride regimen was the liver. Extensive necrosis was present in this organ and it was usually difficult to find any liver cells which did not show evidence of degeneration. Usually only a few cells remained that could be recognized as hepatic cells. In the animals that survived the longer times there were accumulations of connective tissue and distortion of the architecture of the liver, which indicated that some regeneration of the previously damaged liver had occurred but that the new liver cells were later killed by subsequent carbon tetrachloride. In the animals studied at the time of death no differences in the extent of degeneration of the liver could be observed which could be ascribed to

the different diets taken by the animals. The survival time and other essential data concerning the rats which died from hemorrhage during the carbon tetrachloride regimen are summarized in table 1. It should be noted that the rats that received the carbohydrate diet survived about 50 per cent longer than the rats on the

TABLE 1.—Carbon Tetrachloride Regimen: Death from Hemorrhage

Diet	Number of Rats	Lived Days, Average	Loss in Body Weight, Gm.	Per Cent of Diet Taken	Rats with More Than Average Food Lived Days
Mixed.....	58	33	8	70	36
Carbohydrate.....	39	49	6	81	51
Protein.....	58	34	24	82	32
Fat.....	67	29	21	70	28

other diets, while those that received the fat diet died about 12 per cent earlier than those on the mixed or the protein diet.

Microscopic examination of sections of liver taken from rats at various times during the carbon tetrachloride regimen, but before bleeding had occurred, showed some evidence of the protective effects of the diet. Because of the severity of the regimen all the livers were extensively damaged after the first few days and there were no great outstanding differences in appearance with the different diets used. At the same time intervals the greatest amount of necrosis was usually found in the livers of the fat-fed animals and the least in the carbohydrate-fed animals. In some instances the difference was very marked but in others no choice could be made. However, when a difference was present in comparable animals it was always in favor of the carbohydrate-fed animals showing the least amount of necrosis. Regenerative changes in the liver as indicated by the number and size of the round islands of newly formed liver cells were most marked in the meat-fed animals. In many instances these islands of regenerated liver cells did not show as extensive degenerative changes as were found in the other parts of the same liver or were present in the liver of

TABLE 2.—Carbon Tetrachloride Regimen: Chemical Changes

Rat	Coagulation Time, Min.	Prothrombin (Quick), per Cent	Analysis of Hepatic Tissue			Days of Carbon Tetrachloride Regimen	Diet	Change in Weight, Gm.
			Glycogen, per Cent	Total Lipoids, per Cent	Phospholipids, per Cent			
a	5	15	0.20	8.7	2.1	22	Mixed	-8
b	3	90	0.16	7.6	2.8	22	Carbohydrate	-5
c	2	40	0.19	5.7	2.4	22	Protein	-15
d	3	35	0.18	7.6	2.3	22	Fat	-40
e	3	30	0.37	7.3	2.5	39	Mixed	+18
f	6	30	0.18	6.1	2.2	30	Carbohydrate	+14
g	3	50	0.20	6.7	2.4	29	Protein	-21
h	6	20	0.15	11.3	2.1	29	Fat	+2

comparable rats on other diets. It should also be noted that no correlation could be established between the histologic appearance of the liver and the prothrombin content of the blood except for the fact that there was extensive hepatic degeneration in all the animals studied.

Chemical analysis of the livers taken at different times during the regimen likewise failed to show any correlation between the diet used and the prothrombin deficiency. In all animals the carbon tetrachloride pro-

7. Griffith, W. H., and Wade, N. J.: Choline Metabolism: I. The Occurrence and Prevention of Hemorrhagic Degeneration in Young Rats on a Low Choline Diet, *J. Biol. Chem.* 121: 567-577 (Dec.) 1939.

duced a marked lowering of the glycogen content of the liver, approximately a 90 per cent decrease. No marked changes were produced in the lipid content of the liver; the phospholipids and the choline-containing phospholipids were within normal limits but the neutral fat content of the liver tended to increase with time on the regimen and was usually but not always greater in the fat-fed animals. These changes are indicated in table 2. Figure 2 shows the histologic changes of these same livers.

Because of the extensive necrosis of the liver in the animals that showed a prothrombin deficiency and an increased coagulation time, it was considered that an excess of heparin might be present in the blood.⁸ Neutralization experiments with protamine added to normal blood and to the prothrombin-deficient blood did not nullify the difference in coagulation time between

graded 3 on a basis of 1 to 4, and an occasional pus cell. The serum bilirubin was 4.7 mg. per hundred cubic centimeters with a direct van den Bergh reaction. Roentgenograms of the gall-bladder showed a nonfunctioning organ with stones. The flocculation reaction was positive. Roentgenograms of the chest were negative and roentgenograms of the spine revealed only hypertrophic changes in the lumbosacral joints. The serum protein was 6.5 Gm. per hundred cubic centimeters and the bromsulphalein test of liver function revealed dye retention grade 3. The blood cholesterol was 187 mg. and the cholesterol esters were 93 mg. per hundred cubic centimeters of plasma.

The patient became progressively worse in the hospital, and ascites and edema developed; there was also considerable bleeding from the mouth and the gastrointestinal tract. Death was due to hepatic insufficiency. Necropsy revealed cirrhosis of the liver with ascites.

CASE 2.—A woman aged 38 had had painless jaundice for ten months prior to admission. On examination an orange-yellow discoloration of the skin was noted. The liver and

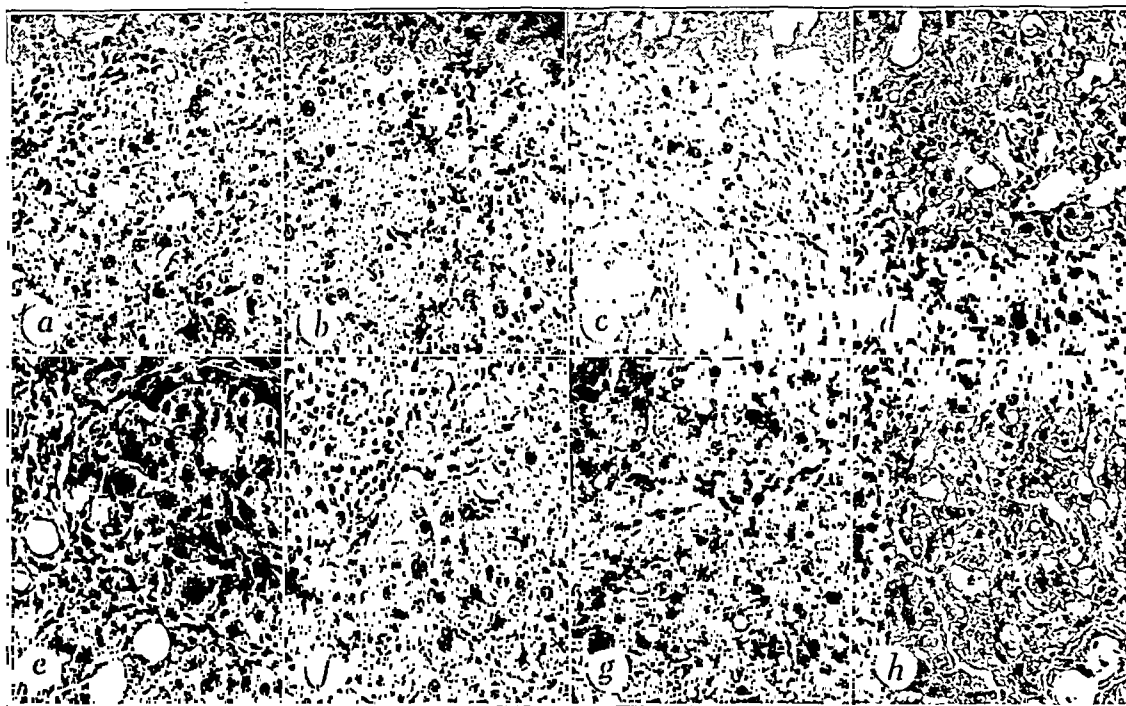


Fig. 2.—Sections of the livers from rats of table 2. All sections show marked degenerative changes. These sections which are representative of the usual appearances show that less degenerative changes occur in the carbohydrate-fed animals. *a* to *d* inclusive, received carbon tetrachloride twenty-two days each; *e* to *h* inclusive, received carbon tetrachloride thirty-nine days each. Examination of sections at a lower magnification than this indicates a greater number of newly formed islands of liver cells in the animals securing the meat diet; $\times 200$.

the normal and the experimental blood. The intravenous injection of as much as 100 mg. of protamine likewise failed to alter the coagulation time or the prothrombin time of blood drawn at subsequent intervals.

CLINICAL RESULTS

The following two cases represent instances of severe hepatic damage associated with a deficiency of prothrombin. The coagulation defect in these cases likewise failed to respond either to large doses of crude concentrates of alfalfa or to synthetic compounds exhibiting marked antihemorrhagic activity.

CASE 1 (fig. 3).—Without any previous significant history except for chronic alcoholism and the use of cinchophen, painless jaundice developed. On examination the concentration of hemoglobin was found to be 13.3 Gm. per hundred cubic centimeters of blood, with 6,800 leukocytes per cubic millimeter of blood. Urinalysis showed a trace of bile, red blood cells

spleen were enlarged, grade 2. There was no evidence of ascites or collateral circulation. There were a few large purpuric spots on her extremities. Otherwise the results of her physical examination were essentially negative.

Urinalysis revealed albumin grade 1, granular casts, and pus grade 1 on the basis of 1 to 4. The hemoglobin was 11 Gm. per hundred cubic centimeters of blood with 4,430,000 erythrocytes and 5,200 leukocytes per cubic millimeter. Blood smears showed hypochromic macrocytosis. The serum bilirubin was 13.8 mg. per hundred cubic centimeters and the van den Bergh reaction was direct. The sedimentation rate was 117 mm. in one hour. The results of the routine flocculation test and roentgenologic examination of the chest were negative. The prothrombin time was forty-two seconds.

Soon after the patient's admission she had a nosebleed and the prothrombin time was further elevated. Following vitamin K therapy the bleeding ceased and the prothrombin time dropped a little but rose again promptly (fig. 4). It was never reduced to less than thirty-two seconds. During her last three weeks illness in the hospital ascites and edema, as well as frequent nosebleeds and purpuric spots on her thighs, developed. The serum bilirubin rose steadily during the last

8. Dam, Henrik, and Glavind, Johannes: Application of the Tissue Extract Method for the Standardization of Heparin, *Skandinav. Arch. f. Physiol.* 52: 221-224, 1939.

two weeks of life. The patient maintained a good urinary output but finally lapsed into hepatic coma. This responded temporarily to the administration of oxygen, dextrose, thiamine hydrochloride and nicotinic acid. Whenever these substances were withdrawn, she lapsed again into coma. The last four days of her life she was almost constantly comatose and there was a considerable amount of bleeding from the bowel. Pneumonia of the base of the right lung developed about a week before she died. Necropsy revealed advanced cirrhosis of the liver.

COMMENT

It should be noted that in all of these experiments the procedure used produced extensive damage to the liver. The small differences noted in the histologic picture of sections of liver from the animals on different diets were due largely to the severity of the procedure. Much greater differences in hepatic damage and survival are rapidly evident when diets deficient in carbohydrate or protein are used. However, in the experiments reported here all the diets contained slightly more of these substances than is necessary for the basal metabolism of the animal and the amount of carbohydrate, protein or fat added to provide additional caloric intake for the animal's activity. Animals not exposed to carbon tetrachloride lived in normal appearing conditions when these diets were fed.

The failure of certain patients with hepatic disease to respond to vitamin K therapy with an elevation of the prothrombin content of the blood appears to be evidence of grave liver impairment. Many of these patients will be found to have suffered irreparable injury. The same failure of prothrombin response to vitamin K may be produced in animals concomitant

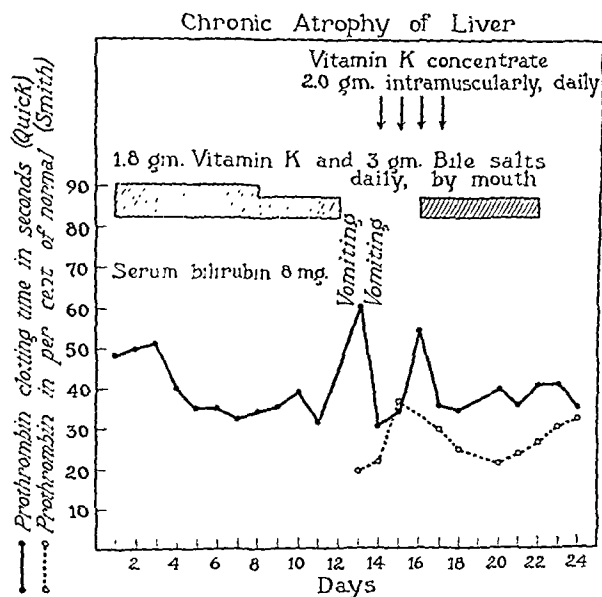


Fig. 3.—Failure of response to concentrate containing vitamin K.

with severe hepatic necrosis. It is encouraging to note that in such animals prompt recovery occurs when the hepatotoxic agent is removed and the liver repair is rapid. Even if administration of the hepatotoxic agent is continued, life may be prolonged by the use of diets rich in carbohydrates.

SUMMARY

Severe hepatic injury is invariably associated with a deficiency of prothrombin in the circulating blood. If the hepatic injury is severe enough, the administration of vitamin K is not effective in correcting this deficiency of prothrombin.

With our experimental procedure, extensive hepatic damage was produced in all animals. Livers from comparable animals that received a basic diet to which had been added carbohydrate, protein or fat showed a marked decrease in glycogen. On microscopic examina-

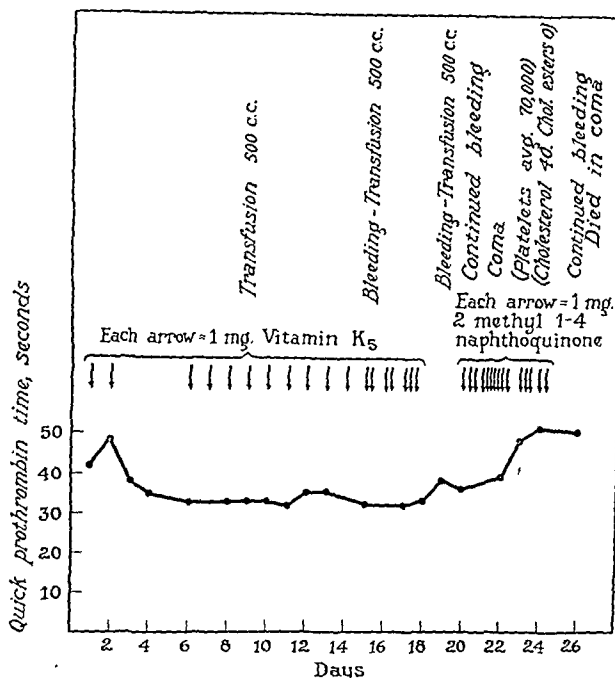


Fig. 4.—Prothrombin level of a patient with cirrhosis of the liver showing failure to respond to vitamin K (2-methyl-4-amino naphthol hydrochloride) supplied by Parke, Davis & Co.; a water-soluble compound of 2-methyl-1, 4-naphthoquinone supplied by Abbott Laboratories, North Chicago, Ill.

tion, the extent of hepatic necrosis appeared greatest with the fat diet and least with the carbohydrate diet, while regenerative changes were more marked in the protein-fed animals. These changes were small in comparison with the extensive necrosis present and no correlation could be made between the condition of the liver and the amount of prothrombin in the blood. However, the animals that received the carbohydrate diet survived without hemorrhage about 50 per cent longer than did those that received other diets.

The deficiency of prothrombin and the lack of response to vitamin K does not appear to be the result of a deficiency of choline either in the diet or in the injured liver. The heparin content of the blood and its antithrombin activity are not greatly altered by extensive hepatic damage.

The failure of vitamin K to maintain the prothrombin level of the blood and the rapid recovery to normal levels of prothrombin after discontinuation of exposure to the hepatotoxic agent indicate that the liver is of fundamental importance in the formation of prothrombin and in the metabolism of vitamin K.

ABSTRACT OF DISCUSSION

DR. STEPHEN MADDOCK, Boston: This is an important paper from both the scientific and the clinical point of view. We have noted at the Boston City Hospital that there are some patients who will not respond to vitamin K, just like the two of Dr. Snell's that Dr. Bollman quoted. When patients of this sort are discovered the prognosis is bad. In reading the original manuscript of Dr. Bollman and his co-authors I noted that the meat-fed animals showed more marked regenerative changes than those on other diets. The islands of regenerating tissue also manifested less susceptibility to subsequent exposure to carbon tetrachloride. Although this fact has been

pointed out by others (Whipple, Opie, Ravdin) the clinician still firmly believes that an almost exclusively carbohydrate diet is necessary in severe liver damage. It may be that a combination of carbohydrate with protein, such as giving plasma intravenously along with dextrose, would be more useful. The question of the mechanism of this failure of vitamin K to work is also quite important. Is it that the liver is required to do something to the vitamin K intake? Does it furnish some co-factor? Or is it possible that in addition to damaging the liver some other factors come in? I did not see anything about fibrinogen determinations, and the prothrombin times were done by the Quick method, which will be definitely affected by lowered fibrinogen. I imagine the authors determined the fibrinogen and said nothing about it. Another question which comes up is whether or not there is an increase in some anticoagulant in the blood. In the original manuscript they determined whether or not heparin was responsible for this bleeding by giving protamine intravenously to their animals. They found no change, so that heparin can be eliminated, but it is possible that there might be some other anticoagulant which could be responsible for the bleeding.

DR. JONATHAN RHOADS, Philadelphia: We have been able to induce hypoprothrombinemias in Philadelphia with carbon tetrachloride, but we have not had as refined a technic as Dr. Bollman has shown you. We have simply given the material by mouth and it works well. Some years ago, when the question of the source of fibrinogen was being studied at the Mayo Foundation, Dr. Mann made the statement that the fact that a hepatotoxic agent will produce a given change cannot be used as proof that the liver is involved in the change. We were so impressed with the logic of this view that Dr. Richard Warren and I performed total hepatectomy in a number of dogs. The prothrombin level declined progressively in these animals until they died. The fall in the prothrombin level was much more rapid than the concomitant fall in fibrinogen concentration. We have observed several patients with hypoprothrombinemia who have failed to respond to vitamin K. While such patients do not all have a bad prognosis, many of them do. Two of these patients died within thirty-six hours after the prothrombin started to rise, another a little later. Sections of the liver obtained at autopsy showed extensive fibrous changes and only scattered liver cells having a normal appearance. With regard to the effect of diet on liver injury produced by carbon tetrachloride in rats, the results obtained by Dr. Bollman were somewhat at variance with those obtained by Goldschmidt, Vars and Ravdin in 1939, who found that in protecting rats against the effects of one hour of chloroform anesthesia much the best results were obtained with a diet that was high in carbohydrate but also high in protein. I should like to ask Dr. Bollman whether any analyses were made on the meat supplement. In Dr. Ravdin's laboratory, difficulty was encountered in using a supplement of beef heart. The expected results were not forthcoming, and it was found on looking up the analysis of beef heart that it contained a substantial amount of fat and that it was necessary to use a pure protein such as casein for the protein supplement.

DR. JESSE L. BOLLMAN, Rochester, Minn.: Dr. Maddock called attention to some things I forgot. He asked about fibrinogen determination. We did determine fibrinogen in our rats. I did not say anything about these determinations because our results were extremely variable. However, in using the Quick method for prothrombin I found it to be accurate in that I can add normal blood, which contains a normal amount of fibrinogen, and also a normal amount of prothrombin to bloods of low prothrombin content. I have diluted this blood; then adding the amount of diluted blood I can determine to a matter of 1 or 2 per cent. I am sure, the actual prothrombin content by the Quick method. Dr. Rhoads brought the difference between my results and the results of Ravdin and his associates. I believe that Dr. Rhoads will agree that changes in the liver, histologic changes in the liver that I showed you, are not of outstanding difference in those different animals. It is pretty much a matter of opinion. Also, considering the fact that Dr. Ravdin's experiments were acute experiments following the administration of one dose of

chloroform, and I used carbon tetrachloride repeatedly. I am not surprised that we can get from a histologic standpoint a variation of opinion. With reference to the utilization of protein, we used muscle for our protein. We also have another series in which I have used casein and another series gelatin, and there is no essential difference among the three.

EPIDEMIC CEREBROSPINAL MENINGITIS (MENINGOCOCCIC)

THE TREATMENT OF 113 PATIENTS WITH ANTIMENINGOCOCCUS SERUM, MENINGOCOCCUS ANTITOXIN AND SULFANILAMIDE

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One hundred and thirteen cases of epidemic cerebrospinal meningitis, representing for the greater part a small epidemic of the disease in Rhode Island, have been admitted to the Charles V. Chapin Hospital since February 1935. The epidemic gave us an opportunity to study the method of treatment of the "genus epidemicus" type of the disease and also to determine the relative therapeutic value of the antimeningococcus serum, the meningococcus antitoxin of Ferry and sulfanilamide.

ANTIMENINGOCOCCUS SERUM

A routine method of treatment, similar to the one which had been used successfully at the Herman Kiefer Hospital by Gordon¹ during the 1927 to 1931 epidemic in Detroit, was adopted at the beginning of the epidemic when severe and fulminating cases were encountered. This consisted of alternate lumbar and cisternal

TABLE 1.—Comparison of Case Fatality Rates in Two Groups of Cases Treated with Antiserum and Antitoxin

	No. of Cases	No. of Deaths	Fatality Rate of All Deaths	Within 48 Hours		Excluding Deaths Within 48 Hours
				Deaths	Rate	
Antiserum	43	18	41.8%	7	28.5%	30.6%
Antitoxin	33	14	42.4%	8	57.1%	21.0%
Totals	76	32	42.1%	15	46.9%	27.5%

injections of antimeningococcus serum at intervals of twelve hours during the first thirty-six or forty-eight hours. After this period treatment was administered once daily, preferably by the lumbar route. The doses for intrathecal treatment were from 5 to 10 cc. less than the amount of spinal fluid removed.

Immediately after the initial intraspinal injection and after a satisfactory sensitivity test for horse serum, a large dose of the antiserum (from 30 to 60 cc. for infants and young children and 90 to 120 cc. for older children and adults), diluted two or three times by volume in physiologic solution of sodium chloride containing 5 or 10 per cent dextrose, was given intravenously. These doses given once or twice were ordinarily sufficient but, in very severe cases and those showing persistent septicemia, larger amounts of the antiserum were given several times, preferably during

1. Gordon, J. E.: Medical Report of the Herman Kiefer Hospital for the Five Years 1927-1931, Detroit, Department of Health, Division of Epidemiology.

the first twenty-four hours. Intrathecal treatment was continued until two consecutive negative spinal cultures were obtained.

The first eight of the 113 patients were treated entirely with antimeningococcus serum of several standard brands. Five of these died, a case fatality rate of 62.5 per cent.

ANTIMENINGOCOCCUS SERUM AND MENINGOCOCCUS ANTITOXIN

About this time (March 23, 1935) Hoyne² reported 296 cases of epidemic cerebrospinal meningitis from the contagious disease department of the Cook County Hospital, Chicago. Eighty-five of these were treated

TABLE 2.—Cases and Deaths by Ten Year Age Groups

Age Group	Cases	Deaths	Fatality Rate
1 to 10.....	35	10	28.6%
11 to 20.....	16	10	62.5%
21 to 30.....	10	5	50.0%
31 to 40.....	9	3	33.3%
41 to 50.....	3	2	66.6%
51 to 60.....	1	0	0.0%
61 to 70.....	2	2	100.0%

with the meningococcus antitoxin of Ferry³ and the remainder, or 211 cases, with two well known standard brands of antimeningococcus serum. The fatality rate in the antitoxin-treated cases was 23.5 per cent compared with 45.9 per cent for antiserum-treated cases.

Early in the same year Banks⁴ in England also reported twenty-five cases treated with the Ferry antitoxin with seven deaths, a case fatality rate of 28 per cent.

Inspired by these favorable reports, we decided to use the new meningococcus antitoxin. The plan was to give meningococcus antitoxin or antimeningococcus serum to alternate patients admitted without regard to the severity of the disease or to the age or sex of the patient. The method of treatment and dosages were the same as those already outlined for antiserum. Seventy-six patients were treated in this way, forty-three with antiserum and thirty-three with antitoxin. The difference in the numbers of cases treated is explained by the fact that patients transferred from general hospitals, where antiserum had already been given, were continued on antiserum, usually of the same make as that previously used.

RESULTS

Eighteen of the forty-three patients treated with antimeningococcus serum died, a case fatality rate of 41.8 per cent. Of the thirty-three meningococcus antitoxin-treated patients fourteen died, a case fatality rate of 42.4 per cent. If patients who died within forty-eight hours of admission are considered insufficiently treated, the rate is 30.6 per cent for the antiserum and 24.0 per cent for the antitoxin.

It is apparent from a comparison of the percentage mortality rates in table 1 that meningococcus antitoxin was no more beneficial than an effective brand of antimeningococcus serum in the treatment of epidemic cerebrospinal meningitis. However, judging from the percentage of deaths occurring within forty-eight hours, it appears that the cases treated with antitoxin were, on the whole, more severe than those treated with the antiserum.

A study of table 2, arranged in ten year groups and respective fatality rates, shows that antiserum and antitoxin were given to equally unfavorable subjects. The youngest patient in these two groups of cases was 3 months and the oldest 64 years old, averaging 14.2 years. The average age of the patients treated with antitoxin was 15.6 years and the average of those treated with antiserum was 13.2 years.

COMPARISON OF OUR RESULTS WITH THOSE OF HOYNE

Our case fatality rate of 41.8 per cent in cases treated with antiserum compares favorably with the 45.9 per cent cited by Hoyne,² but our rate of 42.4 per cent is nearly twice as high as the 23.5 per cent reported by him in his antitoxin-treated cases. The explanation for this difference in results is not obvious. An analysis of factors involved in the therapy of this series of cases fails to reveal any specific reason.

The meningococcus antitoxin used by us was obtained from the same firm⁵ that supplied Hoyne with material for the treatment of his eighty-five cases.

Our method of intrathecal therapy differed from that of Hoyne. We gave alternate lumbar and cisternal injections of the antitoxin every twelve hours during the first thirty-six or forty-eight hours, then followed with one injection daily, by the lumbar route. Hoyne gave lumbar injections once daily, using the cisternal method only when there was a block in the lower route. The fact that our fatality rate among cases treated with antimeningococcus serum compares favorably with that reported by Hoyne seems to indicate that our method of intrathecal treatment was not a factor acting against a favorable rate in the antitoxin-treated cases.

The amount of antitoxin given by us seems to have been adequate. A study of table 3 shows that the average amount of antitoxin administered intrathecally and intravenously in our series of successfully treated cases exceeded that given by Hoyne.

That the answer to this question depends wholly on the therapeutic value of the antitoxin itself may be

TABLE 3.—Amount of Meningococcus Antitoxin Received by Patients Who Recovered in Our and in Hoyne's Series of Cases

	Total Average Amount	Smallest Amount	Largest Amount	Average Amount Parenteral Admin- istered	Average Amount Intrathecal Admin- istered
Our series.....	283.0 cc.	145.0 cc.	620.0 cc.	132.0 cc.	151.0 cc.
Hoyne's series...	161.7 cc.	75.0 cc.	360.0 cc.	59.5 cc.	115.1 cc.

derived from experience in the use of antimeningococcus serum. It is generally known that standard brands of antimeningococcus serum may vary widely in their therapeutic value and that even an effective brand may fail to produce uniformly good results in a given epidemic.

This is likely to be true in epidemics occurring in different parts of the country. It is believed to be due to the difference in the strains of meningococci prevailing in a particular epidemic and the strains used in developing the antibacterial serum. Gordon¹ discarded standard brands of antimeningococcus serum and succeeded in lowering the mortality rate in the 1927 to 1931 epidemic in Detroit by the use, among other measures, of an antiserum developed through immunizing horses with the prevailing strains of the meningo-

2. Hoyne, A. L.: Meningococci Meningitis: A New Form of Therapy. *J. A. M. A.* 104: 980 (March 23) 1935.

3. Ferry, N. S.; Norton, J. F., and Steele, A. H.: Studies of the Properties of Bouillon Filtrate of the Meningococcus: Production of a Soluble Toxin. *J. Immunol.* 21: 293 (Oct.) 1931.

4. Banks, H. S.: Note on Ferry's Meningococcus Antitoxin in the Treatment of Acute Cerebrospinal Fever. *Lancet* 1: 856 (April 13) 1935.

5. Meningococcus Antitoxin, Parke, Davis & Co., Detroit, New and Nonofficial Remedies, *J. A. M. A.* 104: 1007 (March 23) 1935

coccus. Wright and his colleagues⁶ stated that, when a patient with meningococcic meningitis fails to respond to treatment, one cannot justifiably conclude that the strain of organism encountered is resistant to serum therapy but only that the serum used is not specific for that organism.

Branham⁷ expressed the opinion that various lots of antitoxin undoubtedly vary in efficacy, as do those of antibacterial serum, and this will result in conflicting reports of its value until such time as standardization becomes more satisfactory.

Therefore it seems logical to conclude that our less successful results were due in part or wholly to the difference in action of the meningococcus antitoxin itself.

SULFANILAMIDE

In the spring of 1937, among the many startling reports on the curative power of sulfanilamide, was one by Schwentker and his associates⁸ on ten cases of meningococcic meningitis and one of meningococcemia. Recovery occurred in all but one of the cases of meningitis, indicating the effectiveness of the drug against human infection as well as experimental infection in mice reported earlier by Buttle⁹ and confirmed by Rosenthal and his associates.¹⁰

Encouraged by these reports, we decided to include meningococcic meningitis on our list¹¹ of diseases for treatment with sulfanilamide. The routine method of treatment already described was in no way to be changed except that sulfanilamide would be substituted for antiserum and antitoxin and that intrathecal injections (lumbar) would be given once a day until two negative spinal fluid cultures were obtained.

DOSAGES

The doses of sulfanilamide are summarized in table 4.

The initial dose of sulfanilamide is calculated on the basis of 15 grains (1 Gm.) per 20 pounds (9 Kg.) of body weight up to 100 pounds (45 Kg.). Above this weight it is rarely necessary to exceed a total of 90 grains (6 Gm.). We believe it is important to obtain, as soon as possible, blood and spinal fluid concentration of from 10 to 15 mg. or more of the drug per hundred cubic centimeters and to keep the concentration at this level with adequate maintenance doses. It is better, it seems to us, to err on the side of too large rather than too small doses. We have had patients whose blood and spinal fluid reached a level of 25 mg. of the drug without causing any deleterious effects. Depending on the method of administration, the maintenance dose should be given either every four or eight hours, day and night, during the acute stage of the disease. This procedure is followed until the patient has shown unmistakable signs of improvement. The night doses are then omitted. The daily doses must be continued well into convalescence, usually for from seven to ten days, if relapses are to be avoided.

A check on the level of the drug in the blood should be made from four to eight hours after the large initial

dose to determine whether satisfactory concentration has been reached. If found below the desired level, the next maintenance dose should be doubled, followed in four hours by the regular maintenance dose by mouth. Another determination of the blood level of the drug is advised at the end of twenty-four hours. This is to check on the adequacy of the maintenance doses.

Sulfanilamide is excreted principally through the kidneys. Consequently, to maintain a high and even concentration the fluid intake should be restricted to about 2,000 cc. in twenty-four hours in adults, and proportionate amounts in children.

Sulfanilamide is given in tablets or crushed in water or milk. An equivalent amount of sodium bicarbonate should be given with each dose of sulfanilamide in order to avoid acidosis. This condition is apt to

TABLE 4.—Doses of Sulfanilamide in the Treatment of Epidemic Cerebrospinal Meningitis

Tablets for Administration by Mouth			
During Acute Stage of the Disease			
	Initial Dose	Maintenance Dose	Intervals (Day and Night)
Adults (100 lbs. and over).....	50-90 gr.	15-20 gr.	4 hrs.
Adults (50-90 lbs.).....	30-50 gr.	10-15 gr.	4 hrs.
Children (25-50 lbs.).....	20-30 gr.	5-10 gr.	4 hrs.
Babies.....	10-20 gr.	5 gr.	4 hrs.
During Convalescence			
	Maintenance Dose		Intervals
	10-15 gr.		Four times daily
	5-10 gr.		Four times daily
	5 gr.		Four times daily
One per Cent Solution of Powdered Sulfanilamide in Physiologic Solution of Sodium Chloride or in One-Sixth Molar Sodium Lactate for Parenteral Administration During Acute Stage of the Disease			
	Initial Dose	Maintenance Dose	Intervals
Adults (100 lbs. and over).....	700 cc.	500 cc.	8 hrs.
Adults (50-90 lbs.).....	300-500 cc.	200-300 cc.	8 hrs.
Children (25-50 lbs.).....	100-300 cc.	100-200 cc.	8 hrs.
Babies.....	100 cc.	100 cc.	8 hrs.
Intrathecal Administration			
5 to 10 cc. less than amount of cerebrospinal fluid removed			

develop in infants and young children. We have seen it in two of our small children. For parenteral administration, a solution containing 1 per cent of sulfanilamide in physiologic solution of sodium chloride or one-sixth molar sodium lactate is used. When the latter is utilized, sodium bicarbonate is unnecessary.

If the initial dose of the drug is administered by venoclysis, the first maintenance dose by mouth should be given immediately afterward rather than after four hours. This is advisable because of the rapid excretion of the drug by the kidneys as a result of diuresis, which usually follows venoclysis.

METHODS OF SULFANILAMIDE THERAPY

The treatment of epidemic cerebrospinal meningitis has been based principally on the premise that the anti-meningococcus serum, in order to be effective, must come in direct contact with the organisms in the meninges. This necessitated the introduction of the serum directly into the subarachnoid space by way of the lumbar region, cisterna magna or the lateral ventricles.

Since the World War the administration of antibacterial serum intravenously in addition to the intrathecal injection has been generally used on the theory that meningococcemia precedes the meningitis. It has been the belief, however, that little or no antiserum reaches the meninges when given intravenously or subcutaneously.

In 1935 Hoyne² predicted that eventually it would be shown to be entirely unnecessary to administer any

6. Wright, I. S.; DeSanctis, A. G., and Shepler, Adele: The Determination of the Value of Serum in the Treatment for Meningococcus Meningitis, *Am. J. Dis. Child.* 38:730 (Oct.) 1929.

7. Branham, Sara E.: Serum, Antitoxin and Drugs (Sulfanilamide) in Treatment of Meningococcus Meningitis, *M. Ann. District of Columbia* 7:1-5 (Jan.) 1938.

8. Schwentker, F. F.; Gelman, Sidney, and Long, P. H.: The Treatment of Meningococcic Meningitis with Sulfanilamide: Preliminary Report, *J. A. M. A.* 108:1407-1408 (April 24) 1937.

9. Buttle, G. A. H.; Gray, W. H., and Stephenson, Dora: Protection of Mice Against Streptococcal and Other Infections by P-Aminobenzenesulfonamide and Related Substances, *Lancet* 1:1286-1290 (June 6) 1936.

10. Rosenthal, S. M.; Bauer, Hugo, and Branham, Sara E.: Studies in Chemotherapy: Comparative Studies of Sulfonamide Compounds in Experimental Pneumococcus, Streptococcus and Meningococcus Infections, *Pub. Health Rep.* 52:662 (May 21) 1937.

11. Stevens, R. E.: Sulfanilamide in the Treatment of Other Bacterial Infections, *Rhode Island M. J.* 21:145-148 (Oct.) 1938.

serum intrathecally if sufficient antitoxin was injected intravenously. A year later he¹² reported ninety-six cases treated exclusively by intravenous injections of antitoxin with a fatality rate of 15.9 per cent.

The advent of sulfanilamide has placed this method of treatment of epidemic cerebrospinal meningitis on a more rational basis. Banks¹³ and Willien¹⁴ had reported the cure of meningococcic meningitis with sulfanilamide given by mouth or subcutaneously without intrathecal administration. Marshall and his associates¹⁵ reported that they had found sulfanilamide in all body fluids, including the spinal fluid, when the drug was given by hypodermoclysis as well as by mouth. Allott¹⁶ found that the concentration of the drug in the spinal fluid was very nearly that in the blood. We arrived at the same conclusion after a large number of tests.

These facts, together with the relatively simple technic¹⁷ for determining the concentration of the drug in the spinal fluid and blood, make the intravenous, subcutaneous or oral therapy of meningococcic meningitis entirely feasible. Lumbar puncture is done only for the purpose of diagnosis and drainage. Consequently we changed our original method of sulfanilamide therapy. At first we reduced gradually the number of intrathecal injections and finally omitted all but one injection following the first diagnostic lumbar puncture.

istration or by Levine tube, if necessary, every four hours (day and night) during the acute stage of the disease. In mild cases the administration of sulfanilamide in adequate doses by mouth is sufficient.

RESULTS OF SULFANILAMIDE THERAPY

Since the spring of 1937, twenty-nine cases of epidemic cerebrospinal meningitis have been treated entirely with sulfanilamide. This plan of treatment with sulfanilamide has been continued in spite of the fact that experimental¹⁸ and clinical reports¹⁹ have indicated that the combined use of the drug and antibacterial serum or antitoxin is more effective against meningococcic infection than sulfanilamide alone. Our justification for the continuance of this plan is the fact that our results have been very satisfactory. Also there are clinical reports²⁰ showing good results in the use of sulfanilamide alone in the treatment of meningococcic meningitis.

Five of the twenty-nine patients died, a fatality rate of 17.2 per cent. Four of these were in the group of nineteen patients who received daily intrathecal injections as well as parenteral and oral administrations of the drug, and all these deaths occurred within twelve hours of admission to the hospital. The other death was in the group of eight patients who received but one intrathecal treatment in addition to the parenteral and oral therapy and took place fifty-one hours after

TABLE 5.—Influence of Age on Results of Antiserum, Antitoxin and Sulfanilamide Therapy

	Cases			Deaths			Fatality Rates			
	Anti-serum	Anti-toxin	Sulfanilamide	Anti-serum	Anti-toxin	Sulfanilamide	Anti-serum	Anti-toxin	Sulfanilamide	All Cases
Under 1 year.....	4	2	3	0	2	0	0.0%	100.0%	0.0%	22.2%
1 to 5 years.....	13	10	5	5	2	1	38.4%	20.0%	20.0%	28.6%
6 to 10 years.....	6	5	4	4	0	2	66.7%	0.0%	50.0%	40.0%
11 to 20 years.....	12	6	6	7	4	1	58.3%	66.7%	16.7%	50.0%
21 to 30 years.....	7	4	7	3	3	0	42.9%	75.0%	0.0%	33.3%
31 to 40 years.....	5	4	2	2	1	1	40.0%	25.0%	50.0%	36.4%
41 to 50 years.....	2	1	1	1	1	0	50.0%	100.0%	0.0%	50.0%
51 to 60 years.....	1	0	1	0	0	0	0.0%	0.0%	0.0%	0.0%
61 to 70 years.....	1	1	0	1	0	0	100.0%	100.0%	0.0%	100.0%
Totals.....	51	33	29	23	14	5	45.1%	42.4%	17.2%	37.1%

Because of the seriousness of epidemic cerebrospinal meningitis, we consider it imperative that measures to combat this disease be instituted with as little delay as possible. It follows that any method which could quickly bring the concentration of the drug to the optimum level in the blood and spinal fluid should be used. To do this we inject a 1 per cent solution of the drug into the spinal canal at the initial lumbar puncture and immediately follow this with a large dose intravenously or by hypodermoclysis. This helps to raise the blood and spinal fluid level rapidly. It also helps guarantee an adequate concentration against the possibility of poor absorption in the gastrointestinal tract, vomiting or other mishaps which may occur in the management of severely sick and uncooperative patients. When this is accomplished the optimum concentration of the drug is maintained by oral admin-

istration. Two patients who were treated entirely by oral administration of the drug recovered.

Excluding the four deaths within twelve hours, the corrected case fatality rate was 4.0 per cent. This result was impressive. It should be explained that these twenty-nine patients were admitted toward the end of the epidemic when the severity of the disease was decreasing, whereas those treated with antiserum and antitoxin were seen at the peak of the epidemic in 1935 and 1936.

Except for two small children who developed acidosis, there was no serious reaction to sulfanilamide. In no case was the drug discontinued because of its toxic action.

12. Hoyne, A. L.: Intravenous Treatment of Meningococcic Meningitis with Antitoxin, J. A. M. A. 107: 478 (Aug. 15) 1936.

13. Banks, W. L.: Sulfanilamide in Acute Meningococcal Meningitis. Survey Based on One Hundred and Thirteen Cases, J. A. M. A. 108: 955-957 (March 2) 1938.

14. Willien, L. J.: Sulfanilamide Therapy in Meningococcic Meningitis, J. A. M. A. 110: 630-632 (Feb. 26) 1938.

15. Marshall, E. K. J.; Emerson, Kendall, Jr., and Cutting, W. C.: Para-Aminobenzenesulfonamide: Absorption and Excretion; Method of Determination in Urine and Blood, J. A. M. A. 108: 955-957 (March 2) 1937.

16. Allott, E. N.: Sulfanilamide Content of Cerebrospinal Fluid During Treatment, Lancet 2: 13-14 (July 2) 1938.

17. Schmidt, E. G.: The Determination of Sulfanilamide in Tungstic Acid Blood Filtrates by Means of Sodium Beta-Naphthoquinone-4-Sulfonate, J. Biol. Chem. 122: 757-762 (Feb.) 1938.

18. Branham, Sara E., and Rosenthal, S. M.: Studies in Chemotherapy: Sulfanilamide, Serum, and Combined Drug and Serum Therapy in Experimental Meningococcus and Pneumococcus Infections in Mice, Pub. Health Rep. 52: 685-695 (May 28) 1937. Brown, T. M.: Protective Action of Sulfanilamide and Antimeningococcus Serum on Meningococcus Infection in Mice, Bull. Johns Hopkins Hosp. 61: 272 (Oct.) 1937. Branham, Sara E.: The Effect of Sulfapyridine and Sulfanilamide With and Without Serum in Experimental Meningococcus Infection, Pub. Health Rep. 55: 12-24 (Jan. 5) 1940.

19. Waghelestein, J. M.: Sulfanilamide in the Treatment of One Hundred and Six Patients with Meningococcic Infections, J. A. M. A. 111: 2172 (Dec. 10) 1938. Clyde, W. A., and Neely, M. G.: Clinical Experience in the Treatment of Meningococcemia and Meningococcic Meningitis: Analysis of One Hundred and Eighteen Cases Treated with Four Different Methods of Treatment, South. M. J. 32: 594-601 (June) 1939. Banks.¹³

20. Bryant, Joseph, and Fairman, H. D.: Chemotherapy of Cerebrospinal Fever in the Field, Lancet 1: 923-926 (April 22) 1939. Buttle, Gray and Stephenson.⁹ Willien.¹⁴

ANALYSIS OF ENTIRE SERIES

There were forty-two deaths in the entire series of 113 cases, a case fatality rate of 37.1 per cent. Exclusion of the twenty-two deaths occurring within forty-eight hours of admission brings the fatality rate down to 21.9 per cent.

The influence of age on the fatality rate in epidemic cerebrospinal meningitis has been generally considered to be most favorable in the group between 6 and 10 years old and very unfavorable under 1 and over 50 years. Analysis of results in table 5 shows the youngest age group to be the most favorable with two deaths in nine cases, a rate of 22.2 per cent. The next favorable group is the 1 to 5 year group, with eight deaths in twenty-eight cases, a rate of 28.5 per cent. The expected favorable age group of 6 to 10 years has a fatality rate of 40.0 per cent.

It is admitted that statistics based on a small number of cases are subject to error and therefore inconclusive. They are presented here primarily for the sake of completeness.

In all but four of the 113 cases, diagnosis of epidemic cerebrospinal meningitis was confirmed by recovery of the organism either from the spinal fluid or from the blood. The four cases in which meningococcus was not found were diagnosed from the clinical observations alone. These were so definite and typical that a diagnosis of meningococcic meningitis was considered justifiable.

COMPLICATIONS AND RELAPSES

There were two complications in the entire series of 113 cases. One was paralysis of the external rectus muscle of one eye, which developed during the acute stage of the disease. The patient was a woman who was treated with meningococcus antitoxin. The other was total deafness in a child 2 years of age who was treated with antimeningococcus serum.

One relapse was encountered in a youth aged 20 years who had been treated with antiserum. He had recovered from the meningitis in five days. Twelve days later he developed meningococcemia. He recovered after a long period of treatment with antiserum, antitoxin, autogenous vaccine and finally sulfanilamide.

SUMMARY

One hundred and thirteen cases of epidemic cerebrospinal meningitis, representing for the greater part a small epidemic, were treated with antimeningococcus serum, meningococcus antitoxin and sulfanilamide. The case fatality rate for the entire series was 37.1 per cent.

A special study comprising seventy-six cases was undertaken to determine the relative therapeutic values of antimeningococcus serum and the meningococcus antitoxin of Ferry. Forty-three cases were treated with antimeningococcus serum and thirty-three with meningococcus antitoxin with a fatality rate of 41.8 per cent and 42.4 per cent respectively. The result in the latter group was not as favorable as that reported by Hoyne. The reason for this is not obvious but appears to be attributable to the inadequate action of the antitoxin itself.

In a group of twenty-nine cases treated with sulfanilamide alone the fatality rate was 17.2 per cent. In the treatment of these cases intrathecal administrations of the drug were reduced to one in each of eight cases and none in two.

Complications were confined to one each of the antiserum and antitoxin-treated cases and none in the sulfanilamide. There was only one relapse and this was in an antiserum-treated case.

These data and our personal experience in the care of patients with epidemic cerebrospinal meningitis during the last five years have led us to draw the following conclusions:

1. The therapy of epidemic cerebrospinal meningitis with antimeningococcus serum and meningococcus antitoxin is, at best, inadequate. The number of deaths is high, irrespective of the amount of serum used and the methods of treatment employed.

2. The meningococcus antitoxin of Ferry has not been impressive clinically. The results obtained with this form of treatment have not been better than those with standard brands of antimeningococcus serum.

3. Sulfanilamide has been shown to be highly efficacious even when used alone. The clinical results are impressive and in some instances dramatic.

4. Sulfanilamide offers the best means by which the treatment of epidemic cerebrospinal meningitis can be simplified. The drug enters the subarachnoid space readily when given intravenously, subcutaneously or orally. This makes intrathecal administrations of the drug more of an expedient than a necessity.

THE DESIVAC PROCESS FOR DRYING
FROM THE FROZEN STATE

EARL W. FLOSDORF, PH.D.

F. J. STOKES, M.A.

AND

STUART MUDD, M.D.

PHILADELPHIA

During the past few years, evidence has been accumulating which supports the value of human blood plasma or serum as substitutes for whole blood transfusion.¹ In the case of traumatic shock without hemorrhage where there is hemoconcentration, plasma may even be preferable to whole blood.² Even when there is no hemoconcentration, the advantage of a blood substitute not requiring matching of type and one readily available immediately in the emergency is clear. The reduction in hemoglobin which patients can endure without danger is extreme; it is reduction in circulating blood volume which must be corrected promptly. In cases of nephrosis and of increased cerebrospinal fluid pressure as resulting from concussion, the advantage of concentrated plasma or serum is added to the other advantages by virtue of an increased osmotic effect to withdraw fluids into the circulatory system. In dry form resulting from desiccation from the frozen state the plasma proteins may be maintained in highly stabilized form, without refrigeration except for long time reserve-storage, and are instantly available for use by dissolving in water to the original or to a more concentrated volume. Although these proteins may be stored either as plasma or as serum, it appears that the former may be preferable by virtue of minimizing the danger of reactions.³

War-time emergency increases the importance of ready availability of large reserves of this agent in the

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The length of this article does not permit an extensive review of the literature, but from the key references cited a full bibliography may be obtained.

1. Strumia, Max M.; Wagner, Joseph A., and Monaghan, J. Frederick: The Use of Citrated Plasma in the Treatment of Secondary Shock, *J. A. M. A.* **114**: 1337 (April 6) 1940.

2. Moon, Virgil H.: Circulatory Failure of Capillary Origin, *J. A. M. A.* **114**: 1312 (April 6) 1940.

3. Strumia, Max M.; Wagner, Joseph A., and Monaghan, J. Frederick: The Intravenous Use of Serum and Plasma, Fresh and Preserved, *Ann. Surg.* **3**: 623 (April) 1940.

dry stabilized form. However, the dosage for shock is large, 400 cc. being minimal. The aggregate volume of large numbers of such dosages brings out limitations of previously employed processes of desiccation from the frozen state, e. g. the lyophile⁴ and the cryochem⁵ procedures. Accordingly, we will describe a new process which has particular advantage in processing on the large scale required, the desivac process, which has been on trial in our laboratories for several years.

In the lyophile process the water vapor is removed in vacuum by condensers maintained at the temperature of solid carbon dioxide, -78°C . A pressure well under 0.2 mm. is maintained. In the cryochem process a regenerable chemical desiccant, specially prepared calcium sulfate, is used for removal of water vapor. The pressure can be as high as from 1 to 2 mm.

The difference in critical degree of vacuum of the lyophile and cryochem processes reveals that this factor is a function of the efficiency of the means for removing water vapor. The desiccant in the latter process is more efficient than low temperature condensation, permitting a higher operating pressure. Accordingly, with still more efficient means for removal of water vapor, a yet higher critical pressure might be expected to be possible, permitting direct vacuum pump connection with evaporating frozen material.⁶ To provide properly efficient means of water removal requires that the water be removed from the pump continuously with maintenance of the oil at a low vapor pressure.

We have accomplished this by use of pumps of large volumetric capacity which circulate the oil used in the vacuum seal rather than by ordinary pumps which operate in a static bath of oil. The oil from the exhaust or atmospheric side of the pump is passed continuously through a device for separation of water from oil, a continuously operating centrifuge. The water is separated in liquid phase from the oil-water emulsion and the clarified oil is returned directly to the high vacuum side of the pump. In this way, oil of low vapor pressure is continuously available for the high vacuum seal of the pump, and the water vapor is withdrawn from the high vacuum space, as rapidly as it is evaporated, directly to the atmosphere and is discharged there in the liquid phase. This system is so efficient that it will operate at 4.5 mm. of mercury pressure and still keep the materials frozen solid by loss of the latent heat of evaporation. By the end of the drying cycle the pump finally produces a pressure below 200 microns, which readily removes the last traces of water from the material being desiccated so that the residual moisture content is brought well below 1 per cent.

Degassing and self freezing may be employed⁷ or the materials may be prefrozen before evaporation is started. In the former case only about half as much material may be desiccated with a given size apparatus because a much greater amount of water must be evaporated in order to freeze the material as compared with that necessary merely to maintain the frozen state during desiccation. However, by employing an external cooling means, even if insufficient in itself for freezing, the procedure of degassing and self freezing may be made much more efficient than otherwise and the step of freezing is accomplished most quickly and with less manipulation than by external prefreezing.

The material to be desiccated may be treated in bulk or in the final containers as previously described.⁷ In the latter case the containers may be placed on an external manifold and sealed as previously described.⁸ The metal desitube or can containers appear to have definite advantage for the purposes already described.⁹

The containers may be arranged within a vacuum chamber more conveniently, however, for large scale operation. Because of vacuum insulation, degassing and self freezing operates much more efficiently. When combined with external cooling, operation becomes exceedingly simple.

In order to complete desiccation rapidly, it is desirable to circulate warm water in a jacket in the vacuum chamber to supply the heat of vaporization more rapidly, by increasing the temperature of the radiating source within the metal chamber. Such heating was not necessary in the original methods of Shackell¹⁰ or Craigie¹¹ with glass desiccators and is not necessary when the final containers are on an external manifold.⁷ In the latter case the contents are adjacent to the walls of the containers which are in direct contact with the atmosphere, so that heat input is sufficiently rapid.

For breaking the vacuum at the completion of the process, an arrangement is provided for passing the air to the chamber through the dry-air sterilizer previously described,⁵ except that it is one of larger size and is attached directly to a single large valve. The containers are removed and sealed when on external manifolds of the cryochem apparatus or are placed in desitubes.

The chambers may be designed for sterilization by use of steam at 15 pounds pressure. Also sight-glasses are easily provided for watching the progress of drying, reading thermometers, and the like. Equipment is available for desiccation of from 10 to 100 liters daily in a single apparatus. For these large capacities it is lower in initial cost and operation than either the cryochem or the lyophile apparatus.

Although this process is superior for large scale operation in production of blood substitutes, the cryochem process is preferable for smaller scale operation, as in smaller hospitals, particularly up to 1 liter capacity. The quantities of desiccant required are small and its regeneration is exceedingly simple. We have recently improved the cryochem apparatus so that the desiccant and containers of material to be dried are all within a single chamber. The arrangement of these containers with relation to finally admitting dry sterile air and so on is exactly as described in connection with the desivac process. On regeneration of the desiccant the entire apparatus is sterilized, and the dry-air sterilizer built in the apparatus is reconditioned. During drying, the heat of reaction of the water vapor with the desiccant is utilized as the source of heat for evaporation; this may be supplemented by electrical sources, thermostatically controlled by the temperature of the desiccant.

When it becomes necessary to adsorb ethanol and other organic ingredients from solutions being dried, silica gel may be used. This frequently is an advantage. It also permits external prefreezing by immersing the containers in low temperature baths without concern for the solvent adhering to the outer walls of the con-

7. Flosdorf and Mudd, footnotes 4 and 5.

8. Flosdorf, E. W.; Boerner, F.; Lukens, M., and Ambler, T. S.: Cryochem-Preserved Complement of Guinea Pig Serum, *Am. J. Clin. Path.* **10**: 339 (May) 1940. Flosdorf and Mudd, footnotes 4 and 5.

9. Flosdorf, Boerner, Lukens and Ambler.

10. Shackell, L. F.: An Improved Method of Desiccation, with Some Applications to Biological Problems, *Am. J. Physiol.* **24**: 325 (June) 1909.

11. Craigie, James: A Method of Drying Complement from the Frozen State, *Brit. J. Exper. Path.* **12**: 75 (April) 1931.

4. Flosdorf, Earl W., and Mudd, Stuart: Procedure and Apparatus for Preservation in "Lyophile" Form of Serum and Other Biological Substances, *J. Immunol.* **29**: 389 (Nov.) 1935.

5. Flosdorf, Earl W., and Mudd, Stuart: An Improved Procedure and Apparatus for Preservation of Sera, Micro-Organisms and Other Substances—The Cryochem Process, *J. Immunol.* **34**: 469 (June) 1938.

6. Except at a higher pressure, the low mass per unit volume of vapor would require use of impracticably large pumps.

ainers. Although in the cryochem process silica gel is only one half as efficient for water vapor as calcium sulfate per equal weight of desiccant, or one fourth per equal volume¹² (based on aqueous tension of desiccants as determined by maintenance of frozen state during desiccation), the two desiccants may be mixed in order to obtain the superior capacity of calcium sulfate for water. Ten pounds of silica gel will adsorb 20 Gm. of ethanol satisfactorily.

SUMMARY

The desivac process, a new process for vacuum desiccation from the frozen state, is more economical than earlier procedures for vacuum drying on the large scale required, for instance in the preservation of human blood plasma for use as a blood substitute. It is entirely mechanical in operation; the water vapor is removed directly from the high vacuum space and is discharged to the atmosphere in the liquid phase. Low temperature condensation or chemical desiccants are not required.

Improvements in the cryochem process for use in smaller laboratories have been made.

Clinical Notes, Suggestions and New Instruments

HYPERTENSION IN A 7 YEAR OLD GIRL WITH WILMS' TUMOR RELIEVED BY NEPHRECTOMY

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The work of Goldblatt,¹ Page² and others has shown that hypertension may be produced experimentally in dogs and monkeys by effecting a relative ischemia of one or both kidneys. There are many ways in which clinical pathology might simulate the experimental methods of these workers. Blatt and Page³ have studied a case of lymphosarcoma with hypertension apparently due to constriction of both renal arteries by the tumor mass.

Ratliff,⁴ Crabtree⁵ and McIntyre⁶ have reported hypertension in patients with unilateral, chronically infected kidney lesions. Of this group Goldblatt has said,⁷ "It becomes probable that the hypertension associated with unilateral or bilateral pyelonephritis in children and adults occurs only in those cases in which there is associated vascular sclerosis or in which the inflammatory disease produces the same effect on renal circulation as does vascular disease." The reported cases of this type which have come to surgery have been uniformly relieved of hypertension.

Recent reviews of the subject of Wilms' tumor, notably those of Priestley and Broders,⁸ and of Bothe,⁹ have made no mention of blood pressure reading.

We wish to present the case of a little girl in whom marked hypertension seems to have been due to unilateral interference with circulation of the kidney by a tumor of the kidney itself.

12. Volume of desiccant is important with respect to size of the vacuum chamber.

1. Goldblatt, Harry: Experimental Hypertension Induced by Renal Ischemia, Harvey Lecture, Bull. New York Acad. Med. 14: 523-553 (Sept.) 1938.

2. Page, I. H.: The Production of Persistent Arterial Hypertension by Celophane Perinephritis, J. A. M. A. 113: 2046-2048 (Dec. 2) 1939.

3. Blatt, Elmer, and Page, I. H.: Hypertension and Constriction of Renal Arteries in Man: Case (Due to Lymphosarcoma), Ann. Int. Med. 12: 1690-1699 (April) 1939.

4. Ratliff, R. K.: Hypertension of Unilateral Renal Origin, Univ. Hosp. Bull. Ann Arbor 5: 42-43 (June) 1939.

5. Crabtree, E. G.: High Blood Pressure in Destructive Infected Unilateral Lesions of the Kidney, Tr. Am. A. Genito-Urin. Surgeons 31: 299-319, 1938.

6. McIntyre, D. W.: Unilateral Chronic Pyelonephritis with Arterial Hypertension: Apparent Cure After Nephrectomy, J. Urol. 41: 900-905 (June) 1939.

7. Quoted by McIntyre.

8. Priestley, J. T., and Broders, A. C.: Wilms' Tumor: A Clinical and Pathological Study, J. Urol. 33: 544-551 (June) 1938.

9. Bothe, A. C.: Tissue Changes in Mixed Tumors of Kidney After Irradiation, J. Urol. 33: 434 (May) 1935.

REPORT OF CASE

C. W., a white girl aged 7 years, entered the Methodist Hospital Feb. 26, 1940, on the service of Dr. Karl M. Koons, with a history of swelling in the upper part of the abdomen, nontender, noted by her mother seven weeks previously. For the past three or four weeks the child had rested after coming home from school instead of playing as had been her previous habit. No other symptoms were elicited.

The past and the family history were irrelevant except for tonsillectomy in June 1939, at which time her blood pressure was recorded as 120 systolic, 70 diastolic.

The child was rather pale, active and alert. She was 49 inches (124.5 cm.) tall and weighed 47 pounds (21.3 Kg.); on examination the temperature was 100 F., the pulse rate 96 and the respiratory rate 20.

The physical abnormalities were confined to the abdomen. There was a visible tumor in the left upper quadrant which on palpation was firm, only slightly irregular, partially movable, extending up under the rib margin, across the midline and 3 or 4 cm. below the umbilicus. There was no tenderness. The first blood pressure reading, recorded February 28, was 180 systolic, 130 diastolic.

Laboratory examinations revealed the following: Specific gravity of the urine was 1.009, with a very faint trace of albumin; it was alkaline and showed no pus or blood. The blood showed: hemoglobin content 12.5 Gm., or 82 per cent, red blood cells numbered 4,070,000, white blood cells 4,650, polymorphonuclears 60 per cent, eosinophils 1 per cent, small lymphocytes 39 per cent. Coagulation and bleeding time six minutes.

February 27 an x-ray examination of the kidney, ureter and bladder and an intravenous pyelogram revealed a tumor of the upper pole of the left kidney, apparently malignant.

Dr. J. H. P. Gauss saw the patient as a consultant, and immediate operation was decided on, the preoperative diagnosis being Wilms' tumor of the left kidney. A discussion of operation versus roentgen therapy is of great interest but is outside the scope of this paper.

The blood pressure February 29 at 9 a. m. was 156 systolic, 126 diastolic and at 9 p. m. 190 systolic, 155 diastolic.

March 1, under avertin with amylene hydrate-ethyl chloride-ether anesthesia, a left paramedian incision was made; the peritoneum was incised laterally, the kidney freed, and the vessels and the ureter clamped, ligated and cut. Enlarged glands extended out from the pelvis of the kidney and along the aorta and vena cava. One nodule was noted in the under surface of the left lobe of the liver, and no effort was made to remove any of the glands. A transfusion of citrated blood had been started during the operation, and the patient was never in shock. Ten minutes after the operation the blood pressure was 135 systolic, 65 diastolic.

The postoperative course was uneventful. The pulse, which before operation had averaged 96, averaged 120 during the remainder of the hospital stay. The temperature came down to normal on the third day and remained constantly so after the sixth day. Blood pressure readings were as follows: March 2, 130 systolic, 80 diastolic; 3d, 125 systolic, 75 diastolic; 4th, 104 systolic, 68 diastolic; 5th, 125 systolic, 85 diastolic; 6th, 120 systolic, 60 diastolic; 8th, 130 systolic, 90 diastolic; 9th, 128 systolic, 68 diastolic; 10th, 120 systolic, 80 diastolic; 11th, 116 systolic, 76 diastolic. The patient was discharged in good condition on the eleventh postoperative day.

ABSTRACT OF PATHOLOGIC REPORT

The specimen consisted of a tumor mass and kidney 15.5 by 10 by 9 cm. There was a small, firmly circumscribed portion apparently of kidney tissue, although on section the architectural markings were not apparent. On section the tumor itself was very soft and yellowish gray, with small areas of hemorrhagic infiltration. There were a few cystlike cavities filled with a yellowish, gelatinous fluid. Microscopically there was seen fairly normal kidney tissue; then as the tumor was approached this blended into a very firm fibrous tissue, finally blending into the tumor itself, which was made up of compactly arranged round cells, irregular as to size, shape and staining qualities. There was no definite architecture; the stroma consisted of fine fibrous connective tissue.

Farther away from the kidney substance there were areas of marked inflammatory reaction with numerous polymorphonuclears and necrotic cellular debris. The pathologic diagnosis was embryoma of the kidney (Wilms' tumor).

COMMENT

The exact mode of interference with renal circulation is not apparent but was probably due to pressure of the tumor tissue invading the renal pedicle and adjacent lymph nodes. The compactness of the tissues in that area was most evident at operation, before the kidney was freed from its bed. Another possibility was that the neoplastic mass which almost entirely surrounded the kidney acted in the same manner as the cellophane envelope used by Page² to produce experimental hypertension.

The hypertension could scarcely have been due to some product of the tumor itself as metastases were found, yet the blood pressure returned to normal level.

CONCLUSION

In the case here presented of a child with marked hypertension apparently due to unilateral interference with renal circulation by Wilms' tumor, the hypertension was relieved by nephrectomy.

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A SIMPLE, EFFECTIVE, FABRIC RESTRAINT-SPLINT

MAX KAPLAN, M.D.; S. O. LEVINSON, M.D., AND
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A simple muscular ankle and wrist restraint has been effectively used as a restraint-splint in the care of patients with acute anterior poliomyelitis and may be used to advantage in many other conditions. In addition to its simplicity it is inexpensive, can be made universally available and can be used repeatedly.

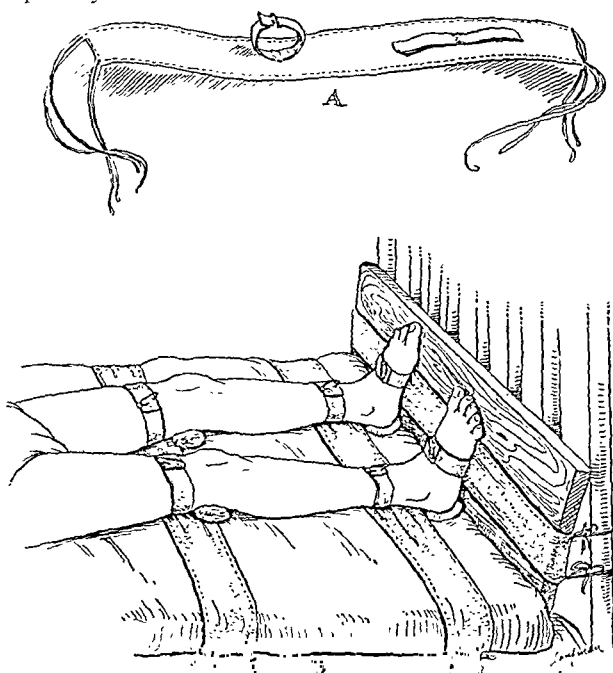


Fig. 1.—Combination restraint and bandage splint. A, showing bandage splint made of heavy cloth with two short strips of cloth attached. One strip made into loop and secured with safety pin. Note ties at ends of cloth. B, three restraint and bandage splints in positions. Note rolls under knees and cotton "doughnuts" under heels. Pads for the soles of the feet are not shown. The combination of this bandage and Carrell's Bradford frame and hinged restraint is excellent.

The indication for its use is as a temporary substitute for the generally used plaster and metal splints for the extremities. In mild cases of poliomyelitis in which there is no paralysis or only slight paresis of muscles of the extremities, the restraint-

splint may be used throughout the acute and subacute stages of the disease.

The purpose of the restraint-splint is to immobilize and comfortably restrain the extremities in order to achieve support, protection against fatigue and overstretching of weakened muscles, and neutralization of antagonist muscle-pull, thus preventing deformities and contractures.

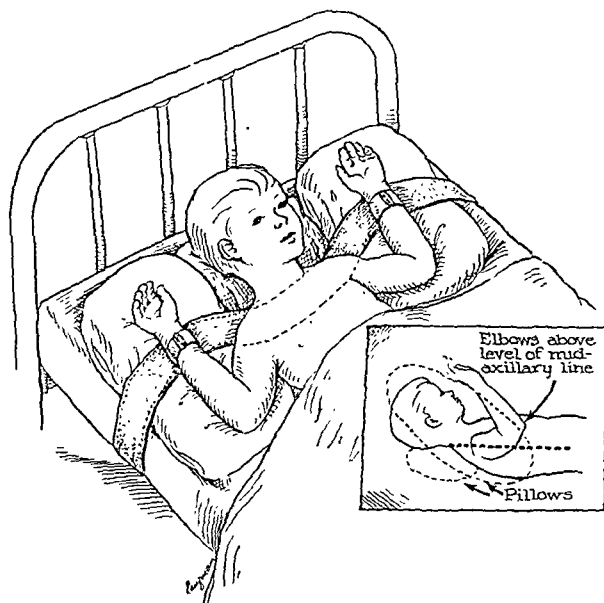


Fig. 2.—Restraint and bandage splint applied to the upper extremities maintaining the physiologic position of neutral muscle pull. Note the pillows, the bandage and the wristlets. The inset indicates the relationship of the arm to the patient's body.

The article consists of a double thickness band of unbleached muslin 6 inches in width and approximately 36 inches in length, hemmed along its four edges. Two shorter strips of muslin about 2 inches in width are sewed, approximately 18 inches apart, on the muslin band in its long axis. Each of these "loop-strips" is attached at its middle, thus leaving the ends free to be looped around an extremity, like a wristlet or anklet, and fastened with a safety-pin. Attached to the corners of the large muslin band are streamers of ordinary cloth bias tape approximately 30 inches in length, which are tied to the sides of the bed or around the foot-support (placed to maintain the feet in dorsiflexion), thus stretching the restraint-splint tautly and securing it in place.

The technic of application to the lower extremities is as follows: The patient is placed on his back with a small flat pillow under the lumbar spine and a small "roll" under each knee. A cotton "doughnut" is placed under each heel. Three restraint-splints are placed across the bed, beneath the patient, at the following levels: (1) around the foot support, (2) just above the ankle, (3) just above the knee. Occasionally, one placed at the midhigh level will be found useful and effective. The tape-streamers are then tied securely to the bed under the spring and mattress or about the foot-support, stretching the restraint-splint flat and taut. The "loop-strips" are placed around the extremities at the various levels and fastened snugly, but not tightly, with safety-pins. Those for the feet are placed around the arch and fastened over the dorsum, thus preventing rotation of the foot and leg, and eliminating sand bags and other bulky devices (fig. 1).

The application to the upper extremity is shown in figure 2, in which is also illustrated the ease and convenience with which the restraint-splint is used in conjunction with pillows as supports.

The advantages of the restraint-splint are ease of manufacture, universal availability, low cost, ease of laundering and sterilizing, ease and simplicity of application. Since so little of the skin surface is covered by the loops, a great part of the patient's skin can be bathed and powdered without the restraints being removed. Furthermore, extremities encased in plaster casts or padded aluminum splints during warm weather become hot, sweaty and uncomfortable. These objections are eliminated to

a great extent by this type of splint. The simplicity of removal and application results in a minimum of disturbance and discomfort to the patient during skin care and toilet. In addition, there is no loss or breakage.

COMMENT

The restraint-splint works very well in conjunction with other devices such as the Bradford frame, the Carrell-Girard frame, the Toronto-LeMesurier splints and split mattresses.

The dimensions of the restraint-splint may be varied according to the size of the patient and the anatomic level at which the restraint is to be placed. The distance between the "loop-strips" may be shortened and thus be made to fit any patient by making a fold at the middle of the large band and securing the fold with safety-pins.

The restraint-splints should be laundered well, ironed without starch and autoclaved after being used. They may be stored or carried ready for use by folding and enclosing them in paper, cloth or cellophane wrappers, each one appropriately labeled according to its purpose; viz., "child," "adult," "upper extremity," "lower extremity." Thus they can be made readily available in every hospital, doctor's and health officer's bag.

The entire restraint-splint can be improvised from an old sheet or towel and a ball of twine or some shoe laces and ten safety-pins. It can be used in a respirator, a farm house or an automobile trailer. It can be made economically in large quantities by Red Cross or WPA workers or by any volunteer organization.

This restraint was designed by Misses Blake, Robeson and Black, the supervisors and instructors of pediatric nursing in Michael Reese Hospital, after a careful survey of restraints used elsewhere. It has been used successfully for restraining a child during the administration of parenteral fluids and other medical and surgical procedures. However, the combination and arrangement of several restraints, as herein described, to form what we call the restraint-splint, have not been to our knowledge used or described before.

They may be effectively used in a variety of conditions and situations where temporary or moderate immobilization is necessary: viz., burns, osteomyelitis, fractures, postoperatively and during the transition period following the removal of braces, casts and splints.

The simplicity of the restraint-splint and the relative ease of large quantity manufacture may well render it useful at the battle front during the periods of transportation and temporary care of the wounded. Injured extremities can be rapidly immobilized with this type of restraint-splint, which can be used on a stretcher as well as on a hospital bed.

We should like to call it the Michael Reese restraint-splint, with the notation that it was first used for poliomyelitis patients by Dr. Kaplan.

A PRACTICAL SUBSTITUTE FOR GLASS COVERSIPS

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My attention has been recently directed to the problem of finding some suitable material that could be used to replace the glass coverslip. Formerly the slips have been imported from Germany, England and Japan. The war has seriously threatened the supply of them, and the price has increased from \$1.50 to \$3.75 an ounce. These factors make the imported slips almost prohibitive to the average hospital laboratory.

After trying various substances, my attention was fortunately directed to plastacele which is made by the E. I. DuPont Company, 626 Schuyler Avenue, Arlington, N. J. Plastacele is perfectly transparent. Regular size coverslips can be easily cut from it with ordinary scissors or any other type of suitable cutting instrument.

Sheets of plastacele can be ordered in various sizes. Ordinarily a sheet measuring 20 by 50 inches will allow about 1,000 coverslips and cost about \$1 a sheet. Order No. C-12-7511.

Coverslips of plastacele are satisfactory for microscopic urinalysis, fecal smears and such purposes. Tissue slides can also be mounted with it, and undoubtedly other uses will be found for them as time passes on.

S10 Doctors Building.

Council on Industrial Health

MEDICAL SERVICE IN INDUSTRY

THE COUNCIL ON INDUSTRIAL HEALTH HAS APPROVED THIS ARTICLE AS ONE OF A SERIES ON MEDICAL SERVICE IN INDUSTRY WHICH WILL APPEAR FROM TIME TO TIME IN THE JOURNAL.

C. M. PETERSON, Secretary.

INTRODUCTION

Large industrial establishments in this country are classified as those which employ more than 500 workers. Many business organizations of this size have found medical supervision over employees, materials, processes and working conditions to be a practical necessity. This trend gains strength as industrialists learn by education and example that maintenance of trained manpower at gainful employment uninterrupted as far as possible by disability from injury or illness is good business. It is possible to demonstrate, as many physicians have done over long periods of time and in all kinds of manufacturing operations, that industrial medical departments can be conducted without compromise of ethical or scientific medical standards

Distribution of Industrial Establishments According to Number of Employees

Establishments Employing	Number of Establishments	Number of Wage Earners
Number of wage earners.....	6,885	.....
1 to 5 wage earners.....	62,164	170,174
6 to 20 wage earners.....	46,402	514,487
21 to 50 wage earners.....	23,138	750,922
51 to 100 wage earners.....	11,911	852,373
101 to 250 wage earners.....	9,745	1,522,670
251 to 500 wage earners.....	3,911	1,363,000
501 to 1,000 wage earners.....	1,660	1,333,323
1,001 to 2,500 wage earners.....	737	1,080,534
2,501 or more wage earners.....	241	1,181,748
Totals	166,794	8,569,231

U. S. Census of Manufacturers, 1937.

and yet in excellent conformity with the purposes of industry. Once this view is widely accepted by industry and the medical profession, greater demand for the services of physicians as a means for conserving the health of workers may be expected.

These demands will probably come soonest from large firms able individually to support adequate medical facilities, yet which have for various reasons failed to develop them. A more important demand should come from small manufacturing units and other commercial enterprises, once a means is found for providing an adequate service which they can with advantage support. The accompanying table describes the distribution of industrial establishments classified according to the number of wage earners employed.

Frequently there is great need for medical service in these small plants, the more so since it is unrealized and since unfavorable sickness or accident experience is not in any sense a function of plant size. The Council on Industrial Health believes that these needs represent a considerable opportunity for medical achievement and that this demand should be encouraged and controlled through the establishment of an educational service which will:

1. Acquaint physicians with the special character of industrial medicine, surgery and hygiene and the necessity for the enforcement of standards defining scope and professional competence.
2. Convince employer and employee alike that medical service in industry merits support only as it is soundly organized economically, scientifically and ethically and that to produce lasting benefits it must be satisfactory both to those who provide and to those who receive the service.

Manufacturers' associations, trade unions, insurance carriers and compensation and other governmental agencies have large and legitimate interests in the workers' safety and health. All are actively engaged in establishing economic, social and humanitarian values of control over industrial accident and disease. In view of this widespread interest the ability of medical organizations to exert a constructive influence on industrial health standards takes on added significance, since other agencies are

not in good position to evaluate medical procedure or facilitate direct application of improved knowledge or technic into actual practice. To relinquish leadership in any program involving the public health to extraprofessional agencies is out of keeping with medical tradition long established in other specialty fields. Principal reliance for improved industrial health standards must rest on medical education and self discipline administered through the physicians' own organizations. The Council on Industrial Health of the American Medical Association was established as a means of focusing attention from all elements in the medical profession on industrial health problems. For identical reasons cooperating committees on industrial health are being organized in the medical societies of states where the nature or concentration of industry appear to justify such a step.

FUNCTIONS OF STATE COMMITTEES ON INDUSTRIAL HEALTH

A program has been developed as a guide to committees on industrial health in state medical associations which has the following well defined objectives:

1. To train industry and labor to the value of industrial health conservation.
2. To develop a clear understanding of the proper scope and functions of industrial medicine and to clarify relationships between private and industrial practice.
3. To keep the medical profession informed about all accepted methods for reducing the frequency and severity of industrially induced disability.
4. To elevate medical relations under workmen's compensation.
5. To scrutinize all legislation affecting the health of industrial workers.
6. To improve relationships between medicine and insurance.
7. To establish working relationships with all agencies in the state interested in industrial health.
8. To arrange for the adoption of similar activities through cooperating committees in the medical societies of the industrial counties.

To accomplish these objectives it has been recommended that the personnel of the state committees include representation from:

1. Private practice.
2. Industrial medical practice.
3. Medical representation if such exists from each of the following:
 - (a) State bureau of industrial hygiene.
 - (b) State workmen's compensation agency.
 - (c) The medical faculties in the state.
 - (d) Industrial insurance company.

A bulletin has been developed by the Council on Industrial Health to permit interchange of ideas between committees of the state societies and as a means of estimating progress.

COUNTY MEDICAL SOCIETY ORGANIZATION

The adoption of similar objectives and methods of organization by cooperating committees in county medical societies provides a sound basis for mobilizing community resources for general or special industrial health activity in accordance with local needs. Under such a plan it should be possible to establish competent sources of information about the character of local industrial operations and the important health problems of each as a first step toward early recognition and control. The resources of other community organizations interested in industrial health need investigation in order to determine how they may contribute to physical betterment of workers under enlightened medical leadership. There will be many opportunities to promote better professional training. The general public can be informed of accomplishments in industrial practice and their effect on the health of the community as a whole. An excellent means is provided whereby the interdependence of private and industrial practice is demonstrated and the activities of both augmented by consulting services in industrial hygiene developed by governmental and private agencies. Working relationships can be promptly established with the allied professional groups—industrial hygienists, safety engineers and industrial nurses.

Recent developments indicate that county society committee organization of this character can contribute materially to the provision of industrial health services for the small plant owner

and his employees interested in deriving benefit from advances in industrial medicine, surgery and hygiene but who in the past have found themselves unable to do so. Most important, it establishes a direct means of assistance to the physician who wants to know how he should conduct himself for greater and more competent participation in this field.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

CONTINENTAL ULTRA SHORT WAVE UNIT MODEL SW-100, ACCEPTABLE

Distributor: Bedford Surgical Company, Inc., 1326 Fulton Street, Brooklyn.

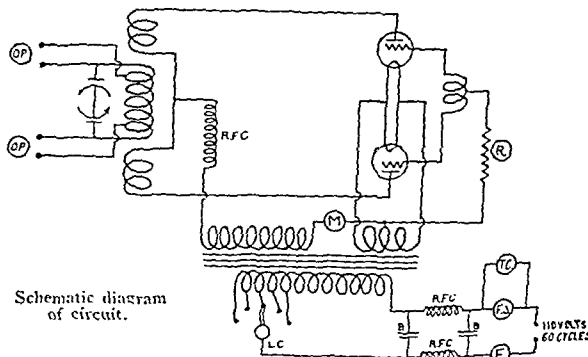
The Continental Ultra Short Wave Unit, Model SW-100, is used for medical and surgical diathermy. Pads, cuffs, inductance coil, surgical accessories and metal electrodes are supplied as standard equipment. The shipping weight of the unit is 120 pounds.



Continental Ultra-Short Wave Unit, Model SW-100.

The firm states that the unit operates on approximately 6 meters and utilizes two tubes in a self-rectifying, push-pull, tuned plate, tuned grid oscillating circuit. The patient's circuit is inductively and capacitatively coupled to the oscillating circuit and is controlled by a split stator condenser in parallel. In tests performed by the Council the power input was found to be 750 watts and the output 280 watts; transformer temperature was 76.3 C. after the unit had been operated at full load for two hours. This temperature comes within the limits of safety prescribed by the Council.

Three radio frequency chokes incorporated in the circuit are said to reduce radio interference.



Schematic diagram of circuit.

The firm submitted data to substantiate claims for heating tissues, which were confirmed by the Council's investigation. The data are as follows:

CUFFS

Technic: Size of cuffs, 2 by 14½. Space under cuffs: Test 1, 1 inch; other tests, 1¼ inches. Space between cuffs: Test 1,

Average Temperature (F.) of Six Tests

	Cutaneous	Subcutaneous	Intramuscular	Rectal
Initial	91.96	94.68	97.88	99.6
Final	99.1	103.25	106.23	99.9

7½ inches; other tests, 7 inches. Average thigh circumference 20 inches. Average room temperature 83 F. Average room humidity 65 per cent.

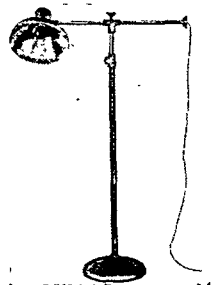
The Council's clinical investigation of the unit revealed that it gave satisfactory clinical service.

The Council voted to accept the Continental Ultra Short Wave Unit, Model SW-100, for inclusion in its list of accepted devices.

GENERAL AUTOMATIC E-40 LAMP ACCEPTABLE

Manufacturer: General Automatic Corporation, Macedonia, Ohio.

The General Automatic E-40 Lamp is an infra-red generator. The source of radiation is mounted in a reflector having a polished metal reflecting surface. The reflector is 10½ inches in diameter and is placed on an adjustable stand. The maximum height of the stand is 71½ inches and the minimum collapsed height is 48 inches; the horizontal adjustment is 24 inches. Power input of the lamp is 260 watts. The weight is 24 pounds.



General Automatic E-40 Lamp.

The firm submitted data concerning the distribution of energy of the lamp compiled by a reliable investigator.

The lamp was investigated clinically by the Council and it was found to give a very intense heat at what is considered a comfortable distance with other infra-red lamps. If placed at a greater distance or angled away from the area to be treated the heat is then comfortable and pleasant. It is necessary to exercise caution when using this lamp owing to

the intense heat. It is easy to focus the heat on the patient with the adjustable arm and can be used for either side of the patient without carrying the lamp from one side to the other, as the extension is long enough for this purpose. The lamp is bottom heavy and will not tip easily.

Advertising submitted by the firm consisted of a folder which contained a description of the lamp. No therapeutic claims are made and the folder appears acceptable.

The Council voted to accept the General Automatic E-40 Lamp for inclusion on its list of accepted devices.

OTARION HEARING AID ACCEPTABLE

Manufacturer: Otation Inc., 448 North Wells Street, Chicago.

The Otation Hearing Aid was given consideration by the Council and its investigation revealed that:

The instrument consists of the following parts:

(a) Combined microphone and vacuum tube amplifier unit. Single control switch.

(b) A and B batteries enclosed in leatherette carrying case.

(c) Crystal midget receiver with molded earpiece.

The microphone and amplifier unit is in a flat molded case 3½ by 2¾ by ¾ inches, weighing 88 Gm. The control is a sliding contact on the edge of the instrument.

The A battery is a single No. 1, ES 1½ volt Burgess dry cell. The measured current drain is 41 milliamperes. The B battery is a 45 volt Burgess R 30 battery. The current drain is 0.54 milliampere. The A battery is carried in a metal sheath in the flap of the Otation.



Otation Hearing Aid.

Mechanical Features.—The instrument is simple in construction, neat and workmanlike in appearance. The tests for amplification show that while the instrument is not uniform over the whole frequency range, in view of the limitations of a miniature amplifier, it provides a fair approximation to uniformity. The tests showed that the instrument gave appreciable amplification at 8,192 cycles.

Carrying Case.—Replacement of both A and B batteries is easily effected. The overall dimensions of the battery case are 4½ by 3 by 1½ inches; total weight, 350 Gm.

Internal Noise.—The instrument is quiet for all settings of the volume control less than about three fourths full on. Above this the instrument is subject to feed back squeal unless the molded earpiece is fitted very well.

Amplification.—The following overall amplifications were shown:

	128	256	512	1,024	2,048	4,096
At normal ear threshold ¾ full on	nil	16	23	40	43	26
At normal ear threshold ¼ on....	nil	nil	20	33	30	22
At approximately 45 decibels above normal threshold, ¾ full on....	nil	12	12	25	23	21

The Council on Physical Therapy voted to accept the Otation Hearing Aid for inclusion on its list of accepted devices.

ROSE "QUARTZ-X" ULTRAVIOLET LAMP ACCEPTABLE

Manufacturer: E. J. Rose Manufacturing Company, Inc., 727-733 East Gage Avenue, Los Angeles.

The Rose "Quartz-X" Ultraviolet Lamp produces ultraviolet radiation and is in the general class of "cold" or low pressure ultraviolet generators.

A transformer, time clock, cable attachment and line cord are located in the base of the lamp. At the top of an adjustable telescoping column rising from the base is a horizontal arm which pivots about the vertical axis of the center column. It also carries a pivot to which is attached a second arm supporting the burner. A dome shaped hood made of molded plastic covers the burner terminals. The two burners supported by the aluminum reflector are parallel and consist of tubing 8 mm. in diameter. One tube is made of fused quartz and the other ultraviolet transmitting glass designated as "Corning 972 UV." (Corex).

In the center of the hood, at the back, is a three position switch lighting either the quartz, corex or both burners. The diameter of the hood is 33 cm. and the reflector is recessed 5 cm. below the rim.



Rose "Quartz-X" Ultraviolet Lamp.

The following evidence concerning the physical characteristics of the lamp was submitted by the firm:

Power consumption (on 110 volts) in watts, and the intensity of therapeutic ultraviolet radiation in microwatts per square centimeter at 24 inches were as follows:

Quartz burner	75 watts	345 microwatts
Corex burner	76 watts	156 microwatts
Both burners	94 watts	435 microwatts

During a three hour test no part of the lamp or transformer case became heated.

The spectral distribution was measured by the ultraviolet photometer and found to be:

Quartz	Corex	Both	
88.5	62	88	Between 2,000 and 2,600
10	34	10.5	Between 2,600 and 3,000
1.5	4	1.5	Between 3,000 and 3,200

in percentage of the total energy in wavelengths less than 3,200 angstroms. Physiologic tests on untanned abdominal skin gave minimum perceptible erythema in the following time:

Quartz burner	90 seconds
Corex burner	240 seconds
Both burners	75 seconds

The Council investigation confirmed these results and showed that the lamp is acceptable as a mercury glow "cold" type lamp. The spectrograms and the transmission data on the glass used in the corex tube show that the ultraviolet output is changed but little from that of the quartz tube.

On submission for the Council's consideration the lamp was named the Rose "Whole Spectrum" Ultraviolet Lamp. When advised by the Council that the name "Whole Spectrum" would not be acceptable, the firm changed the name of the unit to "Quartz-X." The Council was notified of this change by the firm April 25, 1940.

The Council voted to accept the Rose "Quartz-X" Lamp for inclusion on its list of accepted devices.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, SEPTEMBER 28, 1940

THE PLATFORM OF THE AMERICAN MEDICAL ASSOCIATION

The American Medical Association advocates:

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.
2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.
3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.
4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.
5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.
6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.
7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.
8. Expansion of public health and medical services consistent with the American system of democracy.

THE COORDINATING COMMITTEE FOR MEDICAL PREPAREDNESS

An executive order was issued on September 19 setting up, with the approval of the President, under the Council of National Defense, a subordinate body to the council to be known as the Medical and Health Committee. The chairman of this organization is Dr. Irvin Abell, who is also chairman of the American Medical Association's Committee on Medical Preparedness. The order defining the establishment of the committee and its duties follows:

Pursuant to the authority vested in it by section 2 of the act of Aug. 29, 1916 (39 Stat. 649), the Council of National Defense, with the approval of the President, hereby establishes as a subordinate body to the council a committee to be known as the Health and Medical Committee. The committee shall consist of the following members: Dr. Irvin Abell, who shall be chairman, the Surgeon General of the Army, the Surgeon General of the Navy, the Surgeon General of the Public Health Service, and the chairman of the Division of Medical

Sciences of the National Research Council. Vacancies occurring in the membership of the committee shall be filled by appointment by the council with the approval of the President. The members of the committee and of such subcommittees as may be formed by the committee shall serve as such without compensation but shall be entitled to actual and necessary transportation, subsistence and other expenses incidental to the performance of their duties.

It will be the responsibility of the committee to advise the Council of National Defense regarding the health and medical aspect of national defense and to coordinate health and medical activities affecting national defense. In carrying out its functions the committee may (a) utilize, to the extent that such facilities are available for such purpose, the laboratories, equipment and services of the Medical Departments of the Army and Navy, of the Public Health Service and of other government institutions and (b) within the limits of the appropriations allocated to it, to contract with and transfer funds to such institutions and to enter into contracts and agreements with individuals or educational or scientific institutions for studies, experimental investigations and reports.

The committee shall promulgate rules and regulations for the conduct of its work, which rules and regulations shall be subject to the approval of the council and the President.

This executive order brings to a favorable conclusion a cause for which officials of the Association, representing the Board of Trustees and the House of Delegates, have labored persistently since the annual session in June. The work of the American Medical Association in the development of personnel for the military services, for industrial medicine and for maintaining the health of the people can be carried forward with far greater efficiency through the establishment of some relationship directly with the government. The work of the National Research Council in the investigation of procedures to be carried out for military purposes, in the development of information to be circulated to the medical profession and in the standardization of military medical procedures will also be greatly facilitated by this coordinating committee.

No doubt announcements will issue in the near future from the coordinating committee indicating the nature of its activities and the cooperation that will be required from the medical profession. Under the leadership and with the membership of the committee that has been established, the medical profession may give to this committee its complete confidence and an assurance of full cooperation.

MEDICAL CARE AND REFUGEE CHILDREN

Already many children of British scholars have come to this country and are under the care of American teachers in institutions of higher education who have volunteered their assistance. In some instances physicians have wished to participate in this charitable activity, and a few have written to THE JOURNAL requesting information as to how they may secure the children of British physicians. For the present, all such activities are being conducted by the United States Committee for the Care of European Children, Inc., 215 Fourth Avenue, New York City. This agency will give any physician who is especially interested, and who will write to it, specific information.

A physician in an Ohio community was called to attend a small child who had been brought to this country from England for placement in an American home to escape the dangers of war. This physician found that the child was suffering from badly diseased tonsils and adenoids. He recommended an operation but was advised that the surgical procedures contemplated could not be undertaken lawfully until consent was obtained from the child's parents in England. As more and more European children are placed in American homes the problem that confronted this physician will necessarily constantly recur. Any unnecessary delay in providing medical care for the children would be most unfortunate. The United States Committee for the Care of European Children, in which now centers the responsibility of securing American homes for the young refugees, has given this matter of authorization of medical care considerable thought. The committee realizes the importance of the matter and is working on a plan to effect a definite solution to the problem. Pending the completion of this plan, however, the committee thus expresses the view that there need not now be any such delay as was suggested to the Ohio physician:

Pending a more permanent arrangement, the United States Committee and any foster parents, however, are not left completely remediless. We feel that there is a degree of factual background which would enable a foster parent, on the basis of general American law, to consider himself as acting in loco parentis. Among such factors are that the English parents of their own volition sent their child to an American home and assumed all the risks inherent therein, that the American foster parents have taken the child into their home, have supported it, have cared for it, and generally have exercised custodial powers over it. Certainly, it would seem such foster parents could exercise their rights over the child as against any other individuals, with the exception of the child's actual parents. Bearing such factors in mind it would appear likely that American courts would hold that the American foster parent, having assumed all these rights, duties and obligations, would likewise have the power to consent to any necessary medical or surgical treatment of the child.

We feel that there are also two further mitigating circumstances. In the first place it is highly unlikely that the question would ever be raised except by the English parents themselves and it is extremely doubtful, in view of all the circumstances, that they would complain. In the second place, we feel that an American court would be reluctant to hold the United States committee or the foster parents liable for such a given consent when the whole picture of this emergency child care movement was adequately and forcefully presented. If, on the other hand, the foster parents were negligent in handling the matter they should be held liable.

If an American family which receives a European child into its home agrees in so doing to furnish the child with the necessities of life, as probably is the case, there may arise a question of legal responsibility if a delay in furnishing medical care, certainly one of the necessities of life, results in injury to the child even though that delay may be occasioned by uncertainty as to the right on the part of the foster parents to authorize the needed medical or surgical attention. This whole matter, while only one of the many problems incident to the evacuation of European children to this country, is of sufficient importance to justify the hope

that whatever doubts may now exist as to the right to give a valid authorization for the rendering of necessary medical care to the children may be removed without delay.

BODY BUILD AND HYPERTENSION

While the prevailing opinion assumes a constitutional factor in hypertensive diseases, there is no unanimity of opinion on the relation between gross body structure and blood pressure. Robinson and Brucer¹ based their study of this question on a statistical analysis of the periodic health examination records of 3,658 unselected men and women (age concentration of the 1,861 males between 31 and 55 years, that of 1,797 females between 27 and 50 years) who were classified into linear, or narrow chested, and lateral, or broad chested, groups by means of a simple anthropometric index found by dividing chest circumference by standing height and ignoring body weight. Persons of linear build were defined as having a chest/height ratio of less than 0.50, their chest measurement being less than half their height; those of lateral build showed on the average an index of 0.59 or over. A gradual increase in chest circumference was noted for both men and women before the age of 50, with a decrease thereafter. Extremely large chests were not observed in the old age groups. This suggests a high death rate in men with large chests during the previous decades. Men of linear build with chest/height ratios of 0.47 and under showed an average systolic pressure of 114 mm. and an average diastolic pressure of 70 mm. In the average lateral type man the systolic pressure was as high as 130 mm., the diastolic 79 mm. The median and modal systolic pressures rose from 110 mm. in men of linear build to more than 118 mm. in those of lateral constitution; median and modal diastolic pressures rose from 70 mm. in the linear body type to over 77 mm. in the lateral. The tendency in women was similar.

The difference in susceptibility to hypertension in persons of contrasting body build extremes was unusual. Only 4 per cent of the men of linear body structure had systolic pressures over 140 mm., whereas 22 per cent of the laterally built men were definitely hypertensive. Only 2 per cent of the women of the linear type as compared with 27 per cent of those of the lateral type had systolic pressures over 140 mm. Forty-three per cent of the men of linear build but only 17 per cent of those of lateral build had low diastolic pressures under 70 mm., while 60 per cent of the women of the linear constitution but only 34 per cent of those of lateral build showed a similar diastolic trend. Low blood pressures of either kind were accordingly found predominantly in persons of linear body structure and high pressures in the opposite type. Men of the lateral, or broad chested, type had more than four times the expectancy of systolic hypertension and

1. Robinson, S. C., and Brucer, Marshall: Body Build and Hypertension, *Arch. Int. Med.* 66: 393 (Aug.) 1940.

seven times that of diastolic hypertension than men of linear, or narrow chested, gage.

In women the ratio was even more striking, an eleven times greater systolic hypertension expectancy and an eight times greater diastolic hypertension expectancy in those of the lateral type. Moreover, persons of broad build showed higher pressures than persons of narrow build at all age levels. Men of linear build did not show an increased systolic pressure until late in life, women not until after the age of 50. Men of linear type maintained about the same diastolic pressure throughout life. Women of the linear type showed an increase in mean diastolic pressure but not to so great an extent or at such a high level as women of the lateral type. Accordingly the incidence of low systolic pressure was high among persons of the linear build at every age as compared with that of persons of the opposite body build. Diastolic pressures showed much the same tendency. Since the authors believe in a correlation of hypertension with the lateral, or broad, build and of low pressure with the linear, or thin, build they regard the hereditary predisposition to normal pressure and hypertension as an established fact.

Current Comment

PLAGUE IN THE UNITED STATES

The first recorded appearance of plague in the United States occurred in San Francisco on March 6, 1900. In reviewing developments in this country since that time, Hampton¹ points out that human cases of the disease have been reported in eight states in the following chronologic order: California 1900, Washington 1907, Louisiana 1914, Florida 1920, Texas 1920, Oregon 1934, Utah 1936 and Nevada 1937 (the last human case was reported from Millard County, Utah, on Dec. 4, 1939). In all, 499 human cases with 314 deaths were recorded between 1900 and Jan. 1, 1940. Between 1934 and 1939, however, only fifteen cases of plague with six deaths have been reported in the United States, and all of these but four cases and one death occurred in California. This record exists in spite of the fact that plague infection has been demonstrated in fourteen species of ground squirrels and in red squirrels, tree squirrels, flying squirrels, wood rats, kangaroo rats, field mice, prairie dogs, chipmunks, marmots and one cotton tail rabbit, in addition to the more common infection in rats. The reason this widespread sylvatic distribution has not resulted in more human cases may be in part explained by the sparse human settlements in those regions of extensive wild life infection. However, as records already available show, wild rodent plagues may spread unnoticed over wide areas unless intensive measures are taken to detect their presence. Further spread of the infection eastward through a rodent and human population of insufficient density to give rise to explosive epidemics may, however, eventually bring the disease within striking distance

of the rat and human populations of large cities. Here the disease may become epidemic in the presence of a sufficiently high population of rats and a sufficiently high flea index to provide favorable conditions for human infection. Furthermore, as rightly emphasized, the relatively small number of cases of plague during the past forty years does not indicate that too much prominence has been accorded that disease, since its ability to surmount the barrier of quarantine, its persistence and gradual biologic and geographic spread and the difficulty of eradicating it must continue to place it high in the rank of public health problems. The extensive available knowledge of plague prevention and control and the exercise of constant vigilance should guarantee, however, that it need not be permitted to occur in epidemic form in any locality in the United States.

INFANTILE BERIBERI IN HONG KONG

According to a report by Fehily,¹ an investigation at the Infant Welfare Center in Hong Kong revealed that 18 per cent of the infants on first admission showed clinical signs of beriberi, placing this disease immediately after respiratory and cutaneous disorders in order of frequency. It was further found on examination that 81 per cent of those breast fed by mothers whose milk was peroxidase negative (a specific test for vitamin B₁ avitaminosis) were found to show signs of infantile beriberi of varying severity. Previous experiments, Fehily points out, have shown that the milk of women with a B₁ avitaminosis is not only deficient in this vitamin but also actively toxic. Others have succeeded in isolating methylglyoxal from the milk and urine of B₁ avitaminotic women, which may, it is suggested, represent the toxic factor. Although presumably vitamin B₁ deficiency is more common in Hong Kong than in most sections of this country, the observations made there may prove of great value everywhere.

PHYSIOLOGY OF INTERCOSTAL NERVE

The physiologic explanation for the appearance of abdominal symptoms in the presence of thoracic disease, the most notable of which is the referred pain over the appendix sometimes actually resulting in unnecessary surgery, has not been entirely clear. Kahn,¹ in a recent report based on investigations of the intercostal nerves of dogs, found that stimulation of the central end of any intercostal nerve causes a reflex inhibition of respiration and effects a concomitant drop in blood pressure. The lower intercostal nerves (seventh to twelfth) elicit a greater response than do the upper ones. Likewise it was shown that stimulation of sensory or intercostal fibers in the diaphragm causes reflex contraction of the abdominal musculature through a reflex connection with other lower intercostal nerves. These observations contribute to the understanding of the physiologic mechanisms involved in referred pain and the muscular rigidity in the lower abdominal quadrant resulting from involvement of the base of the lung by various pathologic processes.

1. Hampton, Brock C.: Plague in the United States. *Pub. Health Rep.* 55: 1143 (June 28) 1940.

1. Fehily, Lydia: Infantile Beriberi in Hong Kong, the Caduceus (University of Hong Kong) 19: 78 (May) 1940.

1. Kahn, A. J.: Studies on Intercostal Nerve Physiology, *Proc. Soc. Exper. Biol. & Med.* 44: 514, 1940.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

MEDICAL PARTICIPATION IN SELECTIVE SERVICE

CHARLES B. SPRUIT

Lieutenant Colonel (M. C.), General Staff Corps, United States Army; Medical Adviser to the Joint Army and Navy Selective Service Committee

Washington, D. C.

The nation through its representatives in Congress has again decided to increase the armed forces of the United States in accordance with a fair and just system of compulsory selection in order that the obligations and privileges of military training and service may be shared generally. The whole purpose of Selective Service is to procure men for our land and naval forces with a maximum of efficiency, economy and equity, and with a minimum of disturbance to the social, economic, industrial and agricultural life of the nation.

THE CHARACTER OF THE SELECTIVE PROCESS

The salient characteristic of selective service will be that of democracy in action. Men will be registered, classified and selected by boards composed of their neighbors who are empowered to determine for each registrant his liability for military service with fairness to him, the community and the nation. The state and national Selective Service headquarters will be directing and coordinating agencies.

THE OPERATION OF SELECTIVE SERVICE

In general terms, the operation of the Selective Service is as follows: On registration day all men between certain ages will register at their polling places. The registration cards will be numbered serially by local boards. A national lottery will be held in Washington to determine the order in which men in each local board area are liable for selection for military service. The board then sends questionnaires to the registrants. On a basis of his completed questionnaire, the board tentatively decides whether the registrant should be classified as available for military service or should be put in a deferred classification. If the board classifies him as available, it causes him to be examined by its examining physician; if found physically fit, he is definitely classified as available. The registrant may appeal his classification and have his appeal decided by a board of citizens of his state. National headquarters on advice from the armed services will issue a general call on each state to fill its quota. Each state headquarters will issue a similar call to each local board. The local board then selects the required number of available registrants in the order determined by the lottery and orders them to report at a fixed time to a military induction station. Each registrant who is physically and morally acceptable to the military is thereafter inducted into the military service.

EXEMPTIONS

The law provides in general that personnel of the armed services and alien diplomatic officials, consuls and consular agents shall not be required to register.

Exemption from registration obviously precludes selection and induction.

It also provides for certain exemptions from service for ministers of religion and theological students in particular, and for persons who have completed or who are in process of completing certain years of service in the Regular Army or active National Guard. Persons in this category, however, must register.

DEFERMENTS

Provision has been made for the deferment, but not the exemption from service, of additional categories of persons generally stated as follows: (a) the Vice President, governors, legislators and judges of national and state governments; (b) any person holding an office whose continuance therein is found to be necessary in the maintenance of the public health, safety or interest; (c) those whose employment in industry, agriculture or other such occupation is found to be necessary to maintain national health, safety or interest; (d) those with dependents, and finally (e) those men found physically, mentally or morally deficient or defective.

DEFERMENTS FOR STUDENTS

A general deferment from induction for service and training has been provided during the school year 1940-1941 for any person who has entered on attendance in a course leading to a degree at a college or university which grants a degree in arts or science.

NO GROUP DEFERMENTS

The law specifically provides that no deferments will be made in the case of any individual except on the basis of the status of that individual, and further that no deferment shall be made of individuals by occupational groups or of groups of individuals in any plant or institution. It will thus be seen that the deferment of any individual whose exemption or deferment is not specifically provided by law will be decided by local boards on the merits of the case and the demonstration of the necessity for deferment. It is believed that such necessity can be demonstrated for residents and interns in hospitals, for key technical personnel in hospitals and laboratories and for officials in state, county and local health departments, and similar participants in matters of the public health.

CLASSIFICATION

Every registrant will be classified by local boards after due process into one of four general classes:

- Class 1. Those available for service.
- Class 2. Those deferred because necessary in a civil occupation.
- Class 3. Those deferred because of dependent relatives.
- Class 4. Those deferred by law or because obviously unfit for service.

THE ROLE OF THE PHYSICIAN

Inauguration of selective service brings a new responsibility to the medical profession and another opportunity of service to the nation. The role of the physician in the Selective Service mechanism will be

to examine, to find, to evaluate and to recommend. The local board and the appeal board will determine the final classification of all registrants. It is believed that the participation of the physician of the community in determining the physical qualifications of registrants will promote confidence in the fairness of the system and permit of a more accurate determination of the ability of a man to perform military service. The intimate knowledge that the local physician has of the members of his community should be of marked assistance not only in the determination of physical fitness but also in the detection of malingering on the part of men seeking to evade service.

There is a strong feeling in Congress and throughout the nation that, since men are being called to military service at great personal sacrifice, Selective Service officials should be men who are willing to make an important sacrifice by contributing voluntary service, and that a process based on devotion to the national interest should not deteriorate into a job holding organization. It appears very probable, therefore, that no compensation will be provided for members of local boards, boards of appeal, medical advisory boards, examining physicians or similar officials. Clerical employees will unquestionably be paid and will be thoroughly competent in order to free officials of petty clerical routine and leave them free to devote their time to their important responsibilities. Provision, however, has been made to furnish the supplies required in physical examination and to pay for those procedures necessary for the determination of a man's physical fitness, such as laboratory or x-ray examination.

PHYSICAL STANDARDS

It is the present intention of the armed services to accept for induction only those men who are fit for full duty. The physical standards of Selective Service, therefore, will be those of the using services, which in the case of the Army are substantially those now governing enlistments.

It is probable that all men inducted during the coming months will be sent to the Army for training and service. Army standards will accordingly be used. When men are required by the Navy and Marine Corps, the physical standards of those services will be issued and used. It is the general policy that men accepted by the Army for induction shall be immediately available for full training and service and be free from acute communicable disease.

Many physicians in the Selective Service process will be confronted with a new criterion of judgment. The doctor in civil life is concerned in treating his patients so that they may continue their present modes of living and physical endeavor. The criterion of judgment of Selective Service is that the man shall be capable of performing full military service in any type of organization. This criterion may be epitomized by stating that the man, after proper hardening, must be able to walk 15 or 20 miles, carrying 50 pounds on his back, without taking harm to himself in the process.

Since the decision as to the ability of any given registrant to perform such duty depends on the professional judgment of each physician who examines the man, it must be anticipated that there will be honest differences of professional opinion between the examining physicians of the local board and the examining physicians of the medical advisory boards; also between the examining physicians of Selective Service and the examining physicians on the military examining boards. These

will be honest differences of opinion and must be expected and accepted. It is believed that they will be fewer than occurred in the World War, since the same standards of physical examination will be used by Selective Service and by the military examining boards.

LOCAL BOARDS

The basic responsibility of administration and determination will rest on the local boards, whose members will be selected from each of some 6,500 communities. These local boards will determine all deferments and exemptions and make the final and crucial classification, after local physical examination, which makes the registrant available for induction.

THE LOCAL EXAMINING PHYSICIAN

The physical examinations of Selective Service will be made by local examining physicians, who act as agents of the local boards for this purpose. When necessary, additional examining physicians may be appointed by the local board. The local examining physician will examine all registrants sent to him by the local board according to the standards of physical examination which will be furnished him. He will note all deviations from the normal on physical examination forms and then interpret them in the light of the physical standards and in terms of the ability of the registrant to perform full military service. Thereafter he will record his recommendations to the local board as to the physical qualifications of the man to do full or limited military service. If the registrant possesses defects that disqualify him for any military service, that fact likewise will be entered. In those cases in which the local board has appointed additional examining physicians, it may be feasible in certain communities to form an examining group to facilitate and expedite the examinations.

MEDICAL ADVISORY BOARDS

Medical advisory boards will be appointed by the President, on the recommendation of the state, to provide an agency of advice and assistance to examining physicians and to assist appeal boards in determining matters of physical fitness which have been appealed from the decision of the local board by the registrant or by the government agent. The medical advisory boards will as far as practicable comprise internists, ophthalmologists, otolaryngologists, orthopedists, surgeons, psychiatrists, clinical pathologists, radiographers and dentists.

MALINGERING

The experience of Selective Service during the last war showed the necessity of constant vigilance to detect malingering. Many men descended to self mutilation and numerous other more ingenious but less harmful subterfuges to escape military service. Malingerers will doubtless be encountered in the coming operation of Selective Service. Regulations on physical standards mention many of the more common practices used by malingerers to feign disability and describe methods by which these may be detected.

THE MEDICAL TASK

The fall increment of some 400,000 men will be distributed according to quotas to the several states and by each state headquarters to the local boards in that state. On the assumption that these 400,000 men will be equally divided among the 6,500 odd local examining boards, and utilizing the World War percentage of rejections by examining physicians of Selective Service

and of the Army, there will be about ninety men per local board for physical examination. As these men will not all be inducted immediately but will be called up during the following three or four months, the average examination load on each board will probably be between twenty and thirty men per month. These calculations are not applicable to each local board because the quota assigned to a local board takes into consideration certain credits to that community accruing from men presently in the regular services or active National Guard. The total appeals on physical grounds during the World War indicate a lesser load on medical advisory boards. The additional number of cases sent up for advice by local examining physicians is not known.

STATE HEADQUARTERS

The state headquarters operating under the governors of the several states are charged with the organization and operation of the Selective Service system within the respective states under the policies and procedures authorized by the President. For each state the President will designate one or more officers of the Medical Reserve Corps of the Army and Navy as medical assistants on the staffs of the several governors. They will assist the state authorities in the supervision and coordination of medical examinations throughout the state. They will establish and maintain liaison with all examining physicians and members of medical advisory boards, hold regional meetings for them to promote critical discussion and analysis of the medical problems of selective service, and visit medical advisory boards, local boards and examining physicians to advise and assist all concerned with physical examinations. They will keep the necessary records and statistical analyses of the operation of the medical function of Selective Service within the state.

NATIONAL HEADQUARTERS

The National Selective Service Headquarters in Washington will contain a compact medical division, which will assist the director of Selective Service in the determination of policy on medical matters and have general direction and coordination of the medical functions through the state headquarters and the medical assistants in each state.

INTANGIBLE BENEFITS OF SELECTIVE SERVICE

The training and service of hundreds of thousands of young men of the nation during the coming years, the improvement in their physical condition resulting from good food, regular hours, supervised physical endeavor and healthful environment, as well as a revival of that feeling of national unity which seems ever to be a part of a great national effort, will not be the only benefits which the nation will derive from Selective Service. There are certain other dividends which will be worth while. It is expected that the analyses of the reports of physical examinations and other records of Selective Service will make available many new data of sociological and medical importance. The occurrence of disease and disability as to character, locality, age group, color and nativity will give us a new measuring stick by which to judge the efficacy of the many and varied health programs that we have carried on in the last twenty years and will assist in the preparation of new plans for the future. These analyses will further disclose the physical fitness of the new generation and provide us with a current and more accurate measure of the available manpower of the country against "The Day" we pray may never come.

NEW NAVAL MEDICAL OFFICERS

The following candidates have been appointed assistant surgeons of the U. S. Navy with the rank of lieutenant (junior grade) to rank from July 15:

John W. Thomas, Phoenix, Ariz.
Charles J. Allen, Milwaukee.
Milo A. Youel, Minneapolis.
Alfred E. Cronkite, Los Angeles.
Vernon W. H. Campbell, Upper Darby, Pa.
George M. Davis, Bixby, Okla.
Rodney D. Chamberlain, Denver.
Thomas C. Ryan, Buffalo.
Charles G. Butler, Los Angeles.
John W. Flaiz, Vista, Calif.
Lloyd B. Kingsbery, Los Angeles.
Hardy Ulm, Atlanta, Ga.
Thomas L. Greason, Edgewood, R. I.
James H. Abernethy, Altus, Okla.
John F. Roach, Jamaica Plain, Mass.
Paul T. Moore, Milton, Mass.
Vinton Hall, Berkeley, Calif.
John W. Derbyshire, Madison, Wis.
Owen J. Deuby, Detroit.
Herschel E. Richardson, Nashville, Tenn.
Harry F. Lenhardt, Philadelphia.
David C. Stoner, Gettysburg, Pa.
Neville C. Bowers, Washington, D. C.
Melville M. Driskell, Atlanta, Ga.
Samuel S. Spicer, Madison, Wis.
Frank T. Norris, Wake Forest, N. C.
George H. Moseley, Metropolis, Ill.
Henry T. Gannon, Corning, N. Y.
Simon W. Eyer, Felton, Del.
Paul D. Hurley, Jamaica Plain, Mass.
John J. Head, Glen Rock, N. J.
John F. Shrouts, Woodstock, Ill.
John E. Gorman, Wausau, Wis.
David P. Hightower, York, Ala.
Richard B. Williams Jr., Charlottesville, Va.
James G. Kurfes, Raleigh, N. C.
Lester M. Fox, Woodhaven, L. I., N. Y.
Vayle S. Briden, Merced, Calif.
Raymond W. Owens, Los Angeles.
James H. Higgins, Adrian, Mich.
Robert A. Welch, Salt Lake City.
Richard B. Brodrick, Philadelphia.
Deane S. Marcy, Hay Springs, Neb.
Mark R. Rhea, Arlington, Neb.
Bernard G. Geuting, Hamburg, N. Y.
Charles F. Hudson, Richmond, Va.
Jesse H. Sutor, Memphis, Tenn.
Leonard A. Becker, Chicago.

OHIO COMMITTEE MEETS

The committee on medical preparedness of the Ohio State Medical Association held a meeting at the association headquarters in Columbus, August 18, with seven of twelve members present in addition to the chairman, Dr. H. V. Paryzek, Cleveland. Dr. Fred W. Rankin, Lexington, Ky., member of the national committee for the Fifth Corps Area, attended the meeting. Plans were made to urge all physicians to complete and return the questionnaire of the American Medical Association and to request county societies to appoint preparedness committees. At the request of Governor Bricker, the committee discussed medical factors which would be involved in the selection of draft boards and submitted recommendations for his consideration.

ORGANIZATION SECTION

WOMAN'S AUXILIARY

Georgia

The executive board of the woman's auxiliary to the Medical Association of Georgia met in Atlanta with the advisory committee from the association, the latter group approving the year's projected work for the auxiliary at this time. Dr. James N. Brawner, of Atlanta, chairman of the advisory committee, presided over the meeting. Mrs. H. G. Banister, of Ila, recently installed president of the auxiliary, presented an outline of the work to be undertaken during the year. It was decided to sponsor the writing of health plays, and Dr. Brawner offered a prize of \$10 for the best play submitted.

Utah

Mrs. E. L. Van Aelstyn discussed "What the Law Expects of the Physician" and presented the plan of the Utah Medical and Hospital Benefit Association at the March meeting of the auxiliary to the Carbon County Medical Society in Price.

The auxiliary to the Salt Lake County Medical Society has placed *Hygeia* in all the hospitals in Salt Lake City. Mrs. John Z. Brown, president of the auxiliary, presided at the recent meeting when the statue of "Hygeia," which was won as a prize by the auxiliary in the recent Hygeia Contest, was unveiled.

Dr. George Fister and Mr. W. M. Tibballs discussed the plan of the Utah Medical and Hospital Insurance before public meetings under the auspices of the auxiliary to the Utah County Medical Society in Provo recently.

At the February meeting of the auxiliary to the Weber County Medical Society in Ogden, Mrs. Claude L. Shields spoke on "Budgeting Your Time."

Virginia and West Virginia

The woman's auxiliaries to the West Virginia and Virginia medical associations held a joint annual meeting in White Sulphur Springs, W. Va., July 29-31. Mrs. V. E. Holcombe, president of West Virginia auxiliary, also national president, and Mrs. H. A. Latane, president of the Virginia auxiliary, presided over the business meetings of their respective auxiliaries. There were 114 registered from West Virginia and 119 from Virginia.

On West Virginia Day a luncheon was given for both auxiliaries, with Mrs. Holcombe acting as hostess to about thirty distinguished guests at the speakers' table and 200 auxiliary members. Dr. Hugh Trout, president of the Medical Society of Virginia, and Dr. Frank Longfitt, president of the West Virginia State Medical Association, were among the honored guests. The principal address was given by Mrs. Charles P. Corn, president of the Southern medical auxiliary.

At the annual election of officers for the two states, Mrs. H. V. Thomas took office as president of the West Virginia auxiliary and Mrs. Griffin W. Holland as president of the Virginia auxiliary.

At the annual dinner Governor and Mrs. James Price of Virginia and Governor and Mrs. Frank Holt of West Virginia were present. Both governors gave short addresses.

MEDICAL ECONOMIC ABSTRACTS

MEDICAL CARE IN GEORGIA

After making a thorough study of medical facilities and needs throughout the state, the Medical Association of Georgia conducted a symposium on the Problems of Medical Care in Georgia in Savannah, April 24.¹ The statistical study which laid the factual basis of the symposium included a complete survey of the state to determine "the total population per county serviced by one physician, the number of whites per county serviced by one physician, and the square miles covered by one physician per county. These statistics were correlated with the net taxable values per county." This study was conducted by Dr. Alfred A. Weinstein and Dr. C. W. Roberts from the Emory University School of Medicine.

It was found that there was a fairly close correlation between the county taxable values and the number of physicians in the county. "The two extremes were as follows: Chattahoochee County with net taxable values of \$250,630 had no physicians; Fulton County with net taxable values of \$229,775,695 had 653 physicians." When this correlation was graphed it became evident that the "number of physicians in a county begins to rise sharply only after the net taxable values in the county increase over \$2,000,000."

There has been a positive decrease of 144 in the number of physicians in Georgia in the years from 1931 to 1936. This decrease has been largely in the low income rural areas where there were already the fewest physicians. "There were 2,285 physicians engaged in general practice in Georgia in 1938. In the rural areas there is one physician per 1,800 population, in the urban areas 1:1,000, and for the state as a whole 1:1,560. In the United States the ratio was 1:785." It is suggested "that certain counties may see fit to partially subsidize a prac-

itioner to care for the medically indigent, and simultaneously permit him to carry on private practice among those who can afford to pay."

A study of the distribution of hospitals showed that Georgia has a lower ratio of hospital beds per population than most of the states. This is largely due to the low incomes which prevail. Some estimates have fixed the per capita income in Georgia as low as \$146 annually. Dr. T. F. Abercrombie, director of the Georgia Department of Public Health, recognizes that any widespread distribution of hospitals is liable to overlook maintenance costs and expect to obtain these from pay patients. Group hospitalization, while it has proved helpful, does not meet all emergencies. "During an influenza epidemic" in Atlanta "when hospitals were overflowing because people who had paid their hospitalization fee demanded benefits whether hospital care was necessary or not it was almost impossible to get emergency cases admitted." He also finds that malnutrition is an extremely serious problem and that "If the whole population were adequately nourished our public health and medical care programs would be simplified immensely."

There was considerable discussion of hospital programs and plans for the care of the indigent. The discussion of hospital planning was based on illustrations from several counties that had recently constructed hospitals largely under the direction of the county medical society. The problem of adequately staffing these is still an important one. Prepayment plans under the direction of organized medicine were suggested in accordance with the resolutions adopted by the House of Delegates of the American Medical Association.

It was pointed out that education of individuals on the necessity of seeking good medical care and avoiding self diagnosis and self treatment through "patent medicines" and patronage of quacks is of paramount importance.

1. Symposium on the Problems of Medical Care in Georgia, J. M. A. Georgia 29: 341 (July) 1940.

THE GENERAL PRACTITIONER AND HIS HANDBAG

(From the *North Carolina Medical Journal*, June 1940)

In his recent book *The Patient's Dilemma*, Dr. Hugh Cabot quotes the following statement from Dr. Morris Fishbein: "Obviously, 85 per cent of the diseases for which patients consult doctors are of the type which the general practitioner can handle with the amount of equipment that he can carry in a handbag." Dr. Cabot's comment is "We shall, I think, be on sound ground in asserting that this statement never was true and that it is even less true today. . . : I am unaware of any evidence . . . acceptable to any scientific body which would support Dr. Fishbein's allegation."

In an effort to find out which of these views was correct, five Winston-Salem medical men tabulated an average of 200 consecutive cases each. Of the 1,000 patients thus reviewed 848, or 84.8 per cent, had been cared for without any other equipment than the contents of a handbag. A modern doctor's handbag, be it remembered, contains at least a blood pressure apparatus, a stethoscope, a hypodermic syringe, an otoscope, an ophthalmoscope, a transillumination light, a blood counting apparatus, glass slides, a hemoglobin scale, a pleximeter, tongue depressors, Wassermann tubes, culture tubes, and a few other odds and ends.

In tabulating these cases, every patient who had to have a basal metabolism reading, an x-ray examination, an electrocardiogram, an operation or a surgical consultation or who was referred to a clinic for a diagnostic survey was included in the referred group even if the doctor had his own basal metabolism apparatus or electrocardiograph. A considerable number of these referred patients, it should be noted, were beyond real help from any medical source: for example, some with arthritis, some with incurable mental disease, and a few who literally enjoyed poor health too much to exchange it for an active existence.

The lowest proportion of patients cared for unaided by an individual doctor was 82 per cent, the highest 89 per cent. The average of 84.8 per cent is certainly close enough to 85 to be acceptable to most scientific bodies as supporting Dr. Fishbein's statement.

MEDICAL SERVICE ASSOCIATION ORGANIZES

At a meeting of the members of the Medical Service Association of Pennsylvania, held on April 3, 1940, in Harrisburg, the amendments to the by-laws of the association suggested by action of the house of delegates at its special meeting held Feb. 28, 1940, were adopted. The following members were in attendance: Louis H. Clerf, Walter F. Donaldson, Chauncey L. Palmer, Lester H. Perry, David W. Thomas, A. Alfred Wasserman and G. Harlan Wells. Robert L. Anderson and Robert V. White were absent on account of illness.

Immediately following the membership meeting a meeting of the board of directors was held at which the following officers were elected: president, Chauncey L. Palmer, Pittsburgh; first vice president, Louis H. Clerf, Philadelphia; secretary, Lester H. Perry, Harrisburg; treasurer, Robert L. Anderson, Pittsburgh; members of executive committee, Walter F. Donaldson, Pittsburgh, David W. Thomas, Lock Haven, Dr. Palmer, and Mr. Perry.

Three problems were referred to the Executive Committee: (1) The problem of alternative plans on the deductible or limited service principle; (2) the problem of the maximum benefits allowed in any one year, and (3) the wording of the section in the Participating Physician's Agreement to cover the S3 assessment.

At the present time the executive committee is working on these three problems with the objective that within the very near future the entire plan in its revised form will be presented to the state insurance commissioner for his approval.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Personal.—Dr. John B. Plum, Nashville, Tenn., has been appointed to the staff of the state department of health, succeeding Dr. Charles J. Westover, Anniston, as tuberculosis clinician. The latter has resigned to enter private practice in Michigan, newspapers reported.

Society News.—Drs. James A. Becton, Birmingham, and Merle E. Smith, Parrish, addressed the Walker County Medical Society, Jasper, August 9, on "Shock in the Treatment of Certain Mental Diseases" and "The Sulfonamides in Therapy" respectively. Dr. James R. Garber, Birmingham, discussed problems in obstetrics before the society recently.

Medical Seminar.—The Jefferson County Medical Society sponsored a seminar in Birmingham, September 16-17. Among the speakers were Drs. Marion Arthur Blankenhorn, Cincinnati; Francis Bayard Carter, Durham, N. C.; George Argale Harrop, Princeton, N. J.; Willis D. Gatch, Indianapolis; William Wirt Waddell Jr., Charlottesville, Va., and John Albert Key, St. Louis.

ARKANSAS

Personal.—Dr. Louis K. Hundley, Warren, formerly health director of Bradley County, has been assigned to the trachoma control service of the state board of health.

Changes in Health Officers.—Dr. Albert W. Thompson, Bentonville, has been appointed medical director of the Benton County health unit, succeeding Dr. James B. Tucker, resigned. —Dr. Neil E. Compton, Warren, has been appointed director of the Bradley County health unit. —Dr. Raymond E. Smallwood, Little Rock, has been named in charge of the Garland County health unit.

CALIFORNIA

Long Incubation Period in Rabies.—An incubation period of 113 days for rabies was recently reported for a dog in San Francisco, the longest incubation period recorded in the city's history of the disease. According to the health department, this is important in view of the fact that the ordinary quarantine period in California for any dog bitten by a rabid dog is three months. On April 16 a pet dog was bitten by a stray dog. The latter died a few days later of rabies confirmed on microscopic examination of the brain. The pet dog showed a slight wound on the left hind leg and was taken to the public pound, April 19, where it remained in solitary confinement until July 19. Physical examination of this animal on release gave negative results. It is positively stated that it had not come in contact with other dogs. Later in July the animal was returned twice to the pound for clipping and bathing. On August 3 the dog was admitted to a private veterinary hospital because of illness which became gradually worse, and it died August 6 of rabies confirmed by microscopic examination of the brain. In the interval from July 19, when it was released from the pound, to August 3, when the animal became ill, the dog did not come in contact with other animals, having been confined on its owner's premises with the exception of the two return visits to the pound, it was stated. Up to May 15, 1939, when a positive examination for animal rabies was reported, San Francisco had been free from this disease for many years. Since that time there have been sixty-six cases.

DISTRICT OF COLUMBIA

Emergency Facilities.—A booklet has been compiled by the Health Security Administration, Washington, entitled "Emergency Facilities." It is a directory of information on hospitals and ambulances, with particular reference to their locations and methods of immediate contact, and covers the emergency facilities in Washington, nearby Maryland and Virginia. Telephone numbers are listed and various services are classified, making the general information available to the public at large and acting as a time-saver to telephone operators, personnel of police departments, fire departments, hospitals, private physicians and nurses, ambulance attendants and others. The booklet is available on request to the Health Security Administration, Health Security Center, 1823 L Street, N.W., Washington.

FLORIDA

Personal.—Dr. Lamar L. Lancaster, Lake Wales, has been appointed superintendent of the Polk County Hospital, Bartow, succeeding Dr. William L. Hargrove. The latter resigned after fifteen years' service to take over the city hospital on a dollar a year lease basis, newspapers reported.

Annual Regional Meetings.—The fourth annual meeting of the Northeast Medical District of the Florida Medical Association will be held at the Ocean Dunes Club, Daytona Beach, October 3, with the following speakers, among others:

Dr. George M. Green, Daytona Beach, Amnesia and Short Labor.
Dr. Theodore F. Hahn, DeLand, Staphylococcus Toxoid.
Dr. John W. Snyder, Miami, The Splenomegalias with Surgical Indications.

At the fourth annual meeting of the North Central Medical District in the Blanche Hotel, October 4, Lake City, the speakers will include:

Dr. Thomas H. Wallis, Ocala, Use of Endocrines in Treatment of Functional Menstrual Disorders.
Dr. William C. Thomas, Gainesville, A Review of 550 Consecutive Cases of Pregnancy with Hospital Delivery.
Dr. Council C. Rudolph, St. Petersburg, Roseola Infantum.

The fourth annual meeting of the Northwest Medical District at the San Carlos Hotel, Pensacola, October 5, will be addressed by the following, among others:

Dr. James H. Pound, Tallahassee, Case Report of Staphylococcus Septicemia Treated with Sulfathiazole.
Dr. Rayburn N. Joyner, Marianna, Pectin in the Treatment of Chronic Ulcers.
Dr. William H. McCullagh, Jacksonville, Treatment of Some of the Common Neuropsychiatric Disorders.

ILLINOIS

Society News.—Eldridge T. McSwain, Ed.D., associate professor of education, Northwestern University, Evanston, addressed the Peoria City Medical Society in Peoria, September 10, on "Education's Contribution to Adolescence in a Democracy."—The Sangamon County Medical Society was addressed in Springfield, September 5, by Dr. Carl-Gustaf D. Tillman, Topeka, Kan., on "Medical Aspects of Chronic Alcohol Addiction."

Free Laboratory Diagnostic Service.—A limited laboratory service in the diagnosis of cancer is now available from the state department of public health to the physicians of Illinois. Biopsy specimens taken from poor patients will be accepted and examined free at the department's diagnostic laboratories in Chicago. Specimens taken from patients able to pay for such service should be sent to privately operated pathologic laboratories. Physicians and dentists who use this service are urged to select the specimens for biopsy with great care. The specimen should be large enough to include the lesion and also, if possible, a small part of adjacent normal tissue. It should be removed without crushing, placed immediately into a 10 per cent solution of formaldehyde and mailed in a tightly sealed container to the Cancer Diagnostic Service, State Department of Public Health, 1800 West Fillmore Street, Chicago. These specimens should be taken only when there are reasonable grounds for suspecting tumors. Reports of examinations will be placed in the mails usually within forty-eight hours after receipt of specimens. While this service is now limited practically to the laboratory examination of specimens submitted, it is anticipated that later the service can provide a source of material for those interested in tumor pathology and will serve as a medium for the exchange of impartial and friendly views on the diagnosis of tumor material. Dentists and oral surgeons are also invited to use the service. The diagnostic service will work in cooperation with the recently established division of cancer control, the work of which is educational in character. With Dr. Perry J. Melnick in charge, the cancer diagnostic service is a unit in the division of laboratories. Dr. Raymond V. Brokaw is chief of the division of cancer control, an administrative unit of the state department of public health.

Chicago

Society News.—The North Side Branch of the Chicago Medical Society will be addressed, October 3, by Dr. Elliott C. Cutler, Boston, on "The Art of Surgery."

University News.—Charles W. Patterson, Ph.C., registrar of Northwestern University Medical School for twenty-seven years, has been retired with the title associate professor emeritus of pharmacology. He had been associated with the school for forty-seven years.—The medical department of the University of Chicago eventually will receive all of the estimated \$100,000 estate of the late William S. Oppenheim. Under a trust established by the will, the income will go to relatives during their lifetime. The entire residuary estate is left to the university.

IOWA

Personal.—Dr. Albert J. Entringer, in charge of the Dubuque health department, has been appointed a member of the faculty of Loras College, effective September 1; he will lecture on health and hygiene to freshman students.—Dr. Thomas P. Bond, Des Moines, was recently granted life membership in the Polk County Medical Society; he has been a life member of the state medical society for the past three years.—Dr. Harry H. Ennis, LeMars, formerly medical director of district number 1, has been placed in charge of the Northeastern Iowa health unit with offices in Decorah.

Infantile Paralysis in Iowa.—The peak is believed to have been reached in the spread of poliomyelitis in Iowa, newspapers reported September 21. Of 400 cases reported since last spring, 176 were recorded in August and 200 up to September 21. It was estimated that at the time of this report 350 cases were still active. According to the newspapers, the disease was spread fairly evenly over the state, eighty of the ninety-nine counties having one or more cases. However, there were a few definite centers, the city of Waterloo being the hardest hit. Other concentrations were at Sioux City and in the counties of Appanoose and Bremer. All public social activities in Waterloo have been discouraged for several weeks. The opening of the schools was delayed three weeks but was expected to take place September 23. Children were refused admission to theaters, and such gathering places as swimming pools and clubs were closed.

Postgraduate Programs in Des Moines.—The Polk County Medical Society opened a series of postgraduate programs in Des Moines, September 18, with Drs. James T. Priestley, Rochester, Minn., and Clifford J. Barborka, Chicago, as the speakers. Their subjects were, respectively, acute conditions of the abdomen and "Food in the Practice of Medicine." Subsequent programs will be:

October 16: Drs. Addison W. Brown and Lindsay J. Ervin, Des Moines, Carcinoma of the Cervix and Drip Method in Treatment of Syphilis, respectively.

November 20: Drs. James Barrett Brown, St. Louis, and Andrew C. Ivy, Chicago, Traumatic Surgery and Relation of Physiology to Modern Medicine, respectively.

December 18: Dr. Julius S. Weingart, Des Moines, A Short Pathologic Conference.

March 19: Drs. David P. Barr, St. Louis, and George E. Shambaugh Jr., Chicago, The Making of a Diagnosis of Head Infections in Relation to General Practice, respectively.

February 19: Drs. Howard D. Gray, Avoidable Errors in Technique in Surgery of the Female Pelvis; Clifford W. Losh, Some Practical Points of Urology for the General Practitioner; Walter D. Abbott, Surgical Treatment of Intractable Pain, and Dwight C. Wirtz, Treatment of Tendon Injuries. All are of Des Moines.

May 21: Drs. Elmer L. Sevringhaus, Madison, Wis., and Eugene M. Kelling, Chicago, Endocrinology in General Practice and New Drugs, respectively.

April 16: Drs. Richard F. Birge, Des Moines, and Franklin E. Walton, St. Louis, Symposium on the Thyroid.

LOUISIANA

New Professor of Ophthalmology.—Dr. William Burton Clark, associate professor of ophthalmology, Tulane University of Louisiana School of Medicine, New Orleans, has been appointed professor, effective September 1. He succeeds Dr. Wiley R. Buffington, who has retired to devote his full time to private practice. Dr. Clark graduated at Emory University School of Medicine, Atlanta, Ga., in 1927 and has been associated with the faculty at Tulane since 1933.

Personal.—Dr. Edgar Galloway, Vivian, has been chosen superintendent of the Charity Hospital, Shreveport, succeeding Dr. Edgar L. Sanderson, who held the position for twelve years.—Dr. Marion H. Foster, Alexandria, has been appointed superintendent of the Huey P. Long State Charity Hospital, Pineville, succeeding Dr. Osmyn W. McFarland, resigned.—Dr. Edgar Hull, clinical professor and head of the department of medicine, Louisiana State University Medical Center, New Orleans, has been granted a leave of absence from October 15 to May 15 of next year to accept a temporary appointment as associate professor of medicine at Yale University School of Medicine, New Haven.

MARYLAND

Changes in Health Officers.—Dr. Josiah S. Bowen, head of the Baltimore County Health Department for twenty-six years, has resigned, newspapers reported recently. Dr. William H. F. Warthen, assistant health commissioner of Baltimore for the past six years, has been appointed to succeed Dr. Bowen.—Dr. Ralph F. Sikes, formerly with the Connecticut state health department, has been appointed senior medical supervisor in the bureau of venereal diseases in the Baltimore City Health Department.

MASSACHUSETTS

Dr. Packard Named Director of Biological Laboratory.—Charles Packard, Ph.D., of the Institute of Cancer Research, Columbia University, New York, has been appointed director of the Marine Biological Laboratory, Woods Hole. He had been assistant director since 1938 and previously had been clerk of the corporation for seven years. Dr. Packard has been at the Institute of Cancer Research since 1924. He took his doctorate in philosophy at Columbia in 1914.

Institute on Science and Food.—Wellesley College, Wellesley, will hold an institute on science and the nation's food, October 24-26, to bring together nationally recognized experts for discussion, to give undergraduates a sense of "the social outreach of their laboratory discipline" and to emphasize the role of the college as an "agency of scientifically implemented culture" working to advance the common good. The departments of botany, chemistry, economics, geography, hygiene and physiology are cooperating under the direction of Ruth Johnston, Ph.D., of the chemistry faculty.

MICHIGAN

Changes in Health Officers.—Dr. Richard Sears, Fremont, director of the tri-county health unit composed of Newaygo, Oceana and Lake counties since October 1938, has been named director of the Muskegon County health department, succeeding Dr. Reuben J. Harrington.

Appointments at Wayne.—Dr. Carl C. Pfeiffer, formerly of Chicago, has been placed in charge of a new branch of toxicology and will supervise the pharmacodynamic work in the Wayne University College of Pharmacy, Detroit. Paul S. Larson, Ph.D., formerly instructor in physiology at Georgetown University School of Medicine, Washington, D. C., has been appointed lecturer in the department of pharmacology. Dr. Pfeiffer graduated at the Department of Medicine, University of Chicago, in 1937. Dr. Larson received his degree as doctor of philosophy at the University of California in 1934.

Infantile Paralysis.—Fifty-eight counties in Michigan have reported cases of poliomyelitis in September, recording a total of 200 more than for the same period in 1939, according to a release from the state department of health, September 23. Accounting for 298 cases, twenty-four counties reporting five or more cases of the disease through September 18 are: Alger ten, Allegan five, Barry thirteen, Berrien seven, Branch nine, Calhoun eight, Delta ten, Dickinson thirteen, Eaton five, Gogebic seven, Ingham twenty-nine, Iron ten, Kalamazoo fourteen, Kent forty-three, Lapeer thirty-one, Mackinac five, Mecosta five, Midland six, Muskegon eight, Ottawa five, St. Joseph eight, Van Buren eleven, Washtenaw five and Wayne thirty-one. Sixty cases had been reported in September to the time of this report in thirty-four other counties.

New President and Director of Kellogg Foundation.—George B. Darling, Dr.P.H., associate director, and Emory W. Morris, D.D.S., associate executive director of the W. K. Kellogg Foundation, Battle Creek, were elected president and general director, respectively, August 19, succeeding the late Dr. Stuart Pritchard, who held both positions. Dr. Darling and Dr. Morris have been associated with the foundation for many years. Both received their degrees at the University of Michigan. The foundation has announced that it would spend \$2,553,650 in the coming year to further the health and well-being of children. All but \$634,000 will be spent in the counties of Calhoun, Allegan, Van Buren, Barry, Branch, Eaton and Hillsdale, where the foundation conducts community health projects. The \$634,000 will be expended as grants to various institutions.

MINNESOTA

Personal.—Dr. Richard B. Girvin has been appointed Minneapolis medical examiner for the Civil Aeronautics Authority, succeeding Dr. Albert J. Herbolzheimer, who has gone to Washington, D. C., with the authority. —Dr. Marcus H. Flintner, head of the Cass Lake Indian Hospital, Cass Lake, has been transferred to Arizona, where he will be in charge of an Indian tuberculosis sanatorium at Phoenix, according to *Minnesota Medicine*.

NEW JERSEY

Personal.—Robert P. Fischelis, Ph.D., secretary and chief chemist of the Board of Pharmacy of the State of New Jersey, has been appointed a member of the American Council on Pharmaceutical Education as one of three representatives of the American Pharmaceutical Association. The council is the accrediting agency for colleges of pharmacy. Dr. Fischelis will serve six years.

Society News.—Dr. James T. Rugh, Philadelphia, addressed the Gloucester County Medical Society, Woodbury, September 19, on "Low Back Pain—Causes and Treatment." —Dr. Arthur C. DeGraff, New York, will address a stated meeting of the Academy of Medicine of Northern New Jersey, Newark, October 17, on "The Present Status of Digitalis Therapy." —Dr. Frank W. Konzelmann, Philadelphia, addressed the Atlantic County Medical Society, Atlantic City, September 13, on "Biochemistry of Disease." —Dr. Jay Arthur Myers, Minneapolis, will address the Bergen County Medical Society, October 8, at Bergen Pines, on "Follow-Up Work in Tuberculin Testing Surveys."

NEW YORK

District Meetings.—The Fifth District Branch of the Medical Society of the State of New York held its annual meeting at Little Falls, September 24, with the following program:

Dr. Harry Dan Vickers, Little Falls, Newer Concepts of Hypertension.
Dr. George G. Ornstein, New York, Diagnosis of Carcinoma of the Lung.

Dr. Brewster C. Doust, Syracuse, Appendicitis in Children.

Dr. John C. A. Gerster, New York, General and Local Cryotherapy.

Dr. Henry Van Zile Hyde, Syracuse, Chemotherapy.

The Seventh District Branch held its annual meeting at the Clifton Springs Sanitarium, Clifton Springs, September 26. Drs. Herbert F. Dyer, Hamilton, Ont., and Elmer Milch, Buffalo, spoke on "Recognition and Prevention of the Late Toxemias of Pregnancy in Their Incipient Stages" and "Treatment of General Peritonitis Following Ruptured Appendix" respectively. The following officers of the state society made brief talks: Drs. James M. Flynn, Rochester, president; Peter Irving, New York, secretary; Joseph S. Lawrence, Albany, executive officer, and Mr. Dwight Anderson, New York, publicity director. A medical "correct or incorrect" contest was held, with Dr. Floyd S. Winslow, Rochester, as master of ceremonies.

New York City

Personal.—Dr. Russell L. Cecil has been made an honorary member of the Argentine League Against Rheumatism, according to *New York Medical Week*. —Dr. Israel S. Wechsler was appointed a member of the medical board of Hadassah, the Women's Zionist Organization of America, in addition to those reported in *THE JOURNAL*, August 3, page 395.

Tuberculosis Conference.—The Tuberculosis Sanatorium Conference of Metropolitan New York will hold a clinical session at Cornell University Medical College, October 9. The speakers will be Drs. Samuel Cohen, Jersey City, on lymphohematogenous tuberculosis and Oscar Auerbach, Staten Island, extrapulmonary tuberculosis. Dr. Mather Cleveland will present a discussion of "Joint Tuberculosis" and Dr. Howard S. Jeck, "Genito-Urinary Tuberculosis." Dr. Grant Thorburn will preside.

Friday Afternoon Lectures in Brooklyn.—The Medical Society of the County of Kings and Academy of Medicine of Brooklyn will open their series of Friday afternoon lectures October 4, with Dr. A. Benson Cannon as the speaker on "Diagnostic and Therapeutic Aspects of Dermatological Diseases." Other speakers for October will be:

Dr. George G. Ornstein, Clinical Aspects and Recent Contributions to the Treatment of Pulmonary Tuberculosis, October 11.

Dr. James M. Tarsy, Regional and Local Analgesic Injections for Local and Intractable Pain, October 18.

Dr. Samuel L. Siegler, Diagnostic and Therapeutic Aspects of Sterility, October 25.

NORTH CAROLINA

Diseases of Metabolism and of Blood-Forming Organs.—Duke University School of Medicine and Duke Hospital, Durham, will present a symposium, October 31 to November 2, on diseases of metabolism and of the blood-forming organs. The speakers will be:

Dr. Cyrus C. Sturgis, Ann Arbor, Mich., Hemorrhagic Diseases.

Dr. Louis K. Diamond, Boston, Practical Aspects of Treatment of Anemias in Childhood.

Dr. Claude E. Forkner, New York, The Leukemias.

Dr. Elliott P. Joslin, Boston, Diabetes and Its Treatment.

Dr. Thomas B. Cooley, Detroit, Hemolytic Anemias.

Dr. Fuller Albright, Boston, The Diagnosis of Hyperparathyroidism.

Dr. Eugene F. DuBois, New York, Clinical Application and Interpretation of the Basal Metabolic Rate.

Dr. Frank H. Lahey, Boston, President-Elect of the American Medical Association, Management of Hyperthyroidism; also A Practical Discussion of Surgical Diseases of the Thyroid Exclusive of Hyperthyroidism.

Dr. Allen O. Whipple, New York, Indications for and Results Following Splenectomy.

Dr. Leland S. McKittrick, Boston, Surgical Complications of Diabetes.

Dr. George R. Minot, Boston, Some Aspects of the Etiology, Diagnosis and Treatment of Iron Deficiency Anemia and Pernicious Anemia.

Dr. Frank A. Evans, Pittsburgh, The Nature of Obesity, Its Prevention and Cure.

Dr. Alexis F. Hartmann, St. Louis, The Complete Treatment of Diabetes Acidosis.

Dr. Russell M. Wilder, Rochester, Minn., What Is Hyperinsulinism?

OHIO

Personal.—Dr. Francis E. Mahla, Marion, has been appointed health officer of Sandusky and Erie County to succeed the late Dr. Frederick M. Houghtaling. Dr. Mahla was formerly assistant state health director.—Dr. Earl C. Van Horn, Oxford, has been appointed medical superintendent of the Ohio Masonic Home, Springfield.—Dr. Harry A. Neiswander, Pandora, has been appointed health commissioner of Putnam County, succeeding Dr. Louis M. Piatt, Ottawa, resigned.—Dr. Otto K. Engelke, West Union, has resigned as health officer of Adams County to join the Kellogg Foundation, Battle Creek, Mich.—Dr. Jonas L. Hurst, Dorset, has resigned as health officer of Ashtabula County.

Society News.—The semiannual meeting of the Ohio State Hospital Physicians' Association will be held at Longview State Hospital, Cincinnati, October 3-4. Among the speakers will be Drs. Douglas Goldman, Cincinnati, on "Electric Shock Therapy" and George H. Cook and John A. Dole Jr., Gallipolis, "Benzedrine Sulfate in Treatment of Epilepsy." Dr. Tom Douglas Spies, Cincinnati, will open a symposium on vitamin deficiencies and Dr. David A. Boyd Jr., professor of psychiatry, Indiana University School of Medicine, Indianapolis, will be the guest speaker at a banquet Thursday evening.—Dr. Theodore P. Eberhard, medical director of the Ellis Fischel State Cancer Hospital, Columbia, Mo., addressed the Summit County Medical Society, Akron, September 3, on "Certain Phases of the Cancer Problem."—Dr. Edgar V. Allen, Rochester, Minn., will address the Mahoning County Medical Society, Youngstown, October 22, on "Peripheral Circulation."

OKLAHOMA

Personal.—Dr. Woodrow L. Pickhardt, formerly of Chicago, has been appointed health officer of a new unit in Creek County with headquarters in Sapulpa.—Dr. Howe K. Riddle, Coweta, has been appointed health officer of Wagoner County, succeeding Dr. Walter R. Joblin, Porter.

Society News.—Dr. Ferdinand C. Helwig, Kansas City, Mo., addressed the Tulsa County Medical Society, Tulsa, September 23, on "Clinical and Experimental Studies of Coronary Disease with Special Emphasis on Trauma."—Drs. Carl S. McMurray, Nashville, Tenn., and Wam Langston, Oklahoma City, addressed the Southern Oklahoma Medical Association in Shawnee, September 26, on "Endocrine Considerations in Gynecology" and "Blood Dyscrasias" respectively.—Dr. Paul C. Gallaher, Shawnee, addressed the Pottawatomie County Medical Society, Shawnee, July 20, on rheumatic fever.

Annual Fall Clinical Conference.—The tenth annual fall clinical conference of the Oklahoma City Clinical Society will be held in Oklahoma City, October 28-31, at the Biltmore Hotel. Postgraduate courses, general assemblies, round table luncheons and evening symposiums will make up the program. Dr. Nathan B. Van Etten, New York, President of the American Medical Association, will be a special guest, and scientific speakers will include:

Dr. William B. Carrell, professor of orthopedic surgery, Baylor University College of Medicine, Dallas, Texas.

Dr. Robert J. Crossen, assistant professor of clinical obstetrics and gynecology, Washington University School of Medicine, St. Louis.

Dr. Elliott P. Joslin, clinical professor of medicine emeritus, Harvard Medical School, Boston.

Dr. Norman M. Keith, professor of medicine, University of Minnesota Graduate School, Rochester.

Dr. Joseph Earle Moore, associate in medicine, Johns Hopkins University School of Medicine, Baltimore.

Dr. Edmund H. Spaeth, associate professor of ophthalmology, University of Pennsylvania Graduate School of Medicine, Philadelphia.

Dr. A. Elmer Belt, associate professor of urology, College of Medical Evangelists, Los Angeles.

Dr. Morris Edward Davis, associate professor of obstetrics and gynecology, University of Chicago School of Medicine.

Information concerning the conference may be obtained by addressing the secretary, 512 Medical Arts Building, Oklahoma City.

OREGON

Personal.—Dr. Joseph F. Wood, Portland, has resigned as secretary of the state board of medical examiners and from membership on the board. Dr. Linford S. Besson, Portland, is acting secretary.—Dr. Keith P. Russell, Portland, has been appointed director of the division of communicable disease control in the city department of health.

Counties Sponsor Postgraduate Course.—The postgraduate committee of the Polk-Yamhill-Marion Counties Medical Society will sponsor a postgraduate symposium on gastrointestinal diseases by the following members of the faculty of

the University of California Medical School, San Francisco: Drs. Montague S. Woolf, Felix Cunha and Fred H. Kruse. The meetings will be in Salem, October 10-11. There will be a registration fee of \$5.

PENNSYLVANIA

Society News.—Dr. Carl J. Wiggers, Cleveland, addressed the Washington County Medical Society, Washington, September 11, on "The Problem of Ventricular Fibrillation and Cardiac Resuscitation."—Drs. Henry T. Price and Theodore O. Elterich, Pittsburgh, addressed the Westmoreland County Medical Society, Greensburg, September 17, on "Care of the Newborn" and "Convulsions in Childhood" respectively.—Dr. Eldridge L. Eliason, Philadelphia, addressed the Cambria County Medical Society, Johnstown, September 12, on "The Patient and His Fracture."—Dr. Harvey G. Beck, Baltimore, addressed the Lawrence County Medical Society, New Castle, September 5, on "Chronic Illness Resulting from Carbon Monoxide."

GENERAL

Airplane Accidents.—The *Statistical Bulletin* of the Metropolitan Life Insurance Company in its August issue reports that in 1938 deaths resulting from all types of aviation activities, civil and military, numbered 436. Fatalities of this kind were 214 in 1927, 473 in 1928 and 596 in 1930. A decline took place in 1931 to 490 deaths. It is pointed out that one reason why the expected rise in fatalities did not materialize is that the anticipated increase in operation of privately owned planes did not take place.

Association for Advancement of Oral Diagnosis.—The American Association for the Advancement of Oral Diagnosis, established in 1938, will hold its annual meeting at the New York Academy of Medicine, October 17-18, during the annual Graduate Fortnight of the Academy. The purposes of this organization are to correlate oral diagnosis in dentistry and medicine, to encourage the biological, scientific and professional aspects of dentistry, and to foster cooperative research. Physicians and dentists of the organized medical and dental professions who are members in good standing in their respective organizations in the counties in which they practice are eligible for membership. Information may be obtained from H. Justin Ross, D.D.S., 515 Madison Avenue, New York.

Association of Military Surgeons.—The forty-eighth annual meeting of the Association of Military Surgeons of the United States will be held at the Hotel Statler, Cleveland, October 10-12, under the presidency of Major Gen. Charles R. Reynolds, U. S. Army, Ret. Among the speakers will be:

Rear Admiral Ross T. McIntire, Surgeon General, U. S. Navy, Selection of Men Adapted for Special Fields.

Dr. Crawford N. Baganz, Lyons, N. J., So-Called Shell Shock: Types, Etiology and Means for Its Prevention.

Dr. Russell L. Haden, Cleveland, Chemotherapeutic Developments Since the Last War.

Capt. Douglas B. Kendrick Jr., M.C., U. S. Army, Washington, D. C., Preparation, Supply, Distribution and Use of Blood Plasma in Military Service as Determined by the Committee Working with the Research Committee of the National Defense Council.

Drs. Ernest P. McCullagh and George Crite, Cleveland, Differential Diagnosis of Neurocirculatory Asthenia (Soldier's Heart) and Results in 152 Denervations of the Adrenal Glands in Treatment of Neurocirculatory Asthenia.

Lieut. Albert R. Belmke, U. S. Navy, Washington, D. C., Submarine Problems.

Dr. Gustavus M. Blech, Chicago, Surgical Technic in Modern Battle.

Brig. Gen. Frank T. Hines, Administrator of Veterans' Affairs, Washington, D. C., The Veterans' Administration and National Defense.

Committee Studies Antimalarials.—A committee on chemotherapy appointed by the National Research Council to stimulate research on new and useful synthetic drugs has begun its work with antimalarials as its first assignment. The committee was formed as a permanent organization after the group, appointed on a temporary basis by the division of chemistry and chemical technology, had made a preliminary survey of the field of malaria and antimalarials. Its original objective was the study of malaria, in view of the possibility that the supply of quinine from Java may be cut off and because the synthetic drugs are more expensive than many can afford, it was said. After the survey it was felt that the committee should concern itself not solely with antimalarials but should have as its function chemistry in the service of medicine. The broader field will permit the committee to offer its services to combat other diseases as well. The chairman of the committee is Marston T. Bogert, Ph.D., professor emeritus of organic chemistry at Columbia University, and the members are Lyndon F. Small, Ph.D., of the National Institute of Health, Washington, D. C.; Leonard H. Cretcher, Ph.D., assistant director of Mellon Institute, Pittsburgh; Dr.

Lowell T. Coggeshall, of the International Health Division of the Rockefeller Foundation, New York, and Dr. Torald H. Sollmann, dean, Western Reserve University School of Medicine, Cleveland. The committee has as one of its objects a closer cooperation between pharmacologists and chemists. It plans to function as a clearing house for information as to the chemists, manufacturers, pharmacologists and others now at work in the field, the special lines of investigation they are following and any other pertinent data. Preparation of a compact semipopular presentation of the malaria situation throughout the world, and particularly in this country, including a summary of what is being done here and how it is being handicapped and retarded by lack of funds, is another plan. Funds will be sought to support the committee's work, to establish research fellowships and to finance other activities that will advance achievement of its objects. Finally, the committee asks that individuals, organizations, institutions and manufacturers who are willing to cooperate communicate with Dr. Bogert at Havemeyer Hall, Columbia University, New York.

Pan American Congress of Ophthalmology.—The first Pan American Congress of Ophthalmology, sponsored by the American Academy of Ophthalmology and Otolaryngology, will be held in Cleveland, October 11-12, immediately after the annual meeting of the Academy. Among speakers announced for the program are:

Dr. Manuel U. Troncoso, New York, The Value of Gonio-copy in the Prognosis and Treatment of Glaucoma.

Dr. Manuel Marquez y Rodriguez, Mexico City, The Best and Most Exact Method for Diagnosis of Slight Astigmatism by Means of Bicylindrical Combinations.

Dr. Genseric G. Jayme, Annapolis, Brazil, Cephalic Tetanus of Ocular Origin.

Dr. Pereira Gomes, São Paulo, Brazil, Tumors of the Optic Nerve.

Dr. Tomas R. Yanes, Habana, Cuba, Dacryocystorhinostomy.

Dr. Carlos Charlin, Santiago, Chile, Occult Tuberculosis of the Eye.

Dr. William L. Benedict, Rochester, Minn., Orbital Hyperostosis.

Dr. Daniel B. Kirby, New York, Congenital Bilateral Colobomata of the Upper and Lower Eyelids: Plastic Surgical Correction.

Drs. Alan C. Woods and Jack S. Guyton, Baltimore, Chemotherapy in Ophthalmology.

Dr. Samuel Hanford McKee, Montreal, Canada, Observations on the Fundus Oculi in Diabetes Mellitus.

It is expected that the Pan American congress will be placed on a permanent basis during this meeting. The committee that has arranged the first congress is made up of Drs. Harry S. Gradle, Chicago; Conrad Berens, New York, and Moacyr E. Alvaro, São Paulo, Brazil.

CANADA

Personal.—Dr. Charles W. MacMillan, St. John, has been appointed chief medical officer for the province of New Brunswick.—Dr. George F. Stephens, superintendent of the Winnipeg General Hospital, Winnipeg, Man., for twenty-one years, has been appointed superintendent of the Royal Victoria Hospital, Montreal.

FOREIGN

Hospital Equipment for China.—A fund contributed by the Committee for Medical Aid to China in Victoria, B. C., Canada, has been used to establish a library in connection with the medical school at Yenan and to purchase an x-ray machine for the Kuomaio Model Hospital in memory of Dr. Norman Bethune, Canadian surgeon who went to China in 1937. Dr. Bethune died Nov. 13, 1939, of septicemia following an injury received while operating. In addition to working with the wounded immediately behind the lines, Dr. Bethune organized the International Peace Hospitals, which now include four base hospitals, a transport network for supplies and mobile medical teams. The library will be an invaluable aid to medical students who have been studying with roughly duplicated notes and an almost total lack of reference material, according to the China Defense League *Newsletter*. The hospitals are in urgent need of surgical instruments and equipment, including many types of forceps, scissors, Luer syringes, hypodermic needles and various kinds of rubber tubes.

CORRECTION

Health Department Headquarters Remain in Sacramento.—The director of the state department of public health of California, Dr. Bertram P. Brown, writes that headquarters of the department will remain in Sacramento with branch offices in Los Angeles and San Francisco as heretofore. An announcement that the headquarters of the department had been moved to Los Angeles, published in *THE JOURNAL*, September 7, page 867, was based on reports appearing in the newspapers.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Aug. 17, 1940.

Hysterical Contractures Following War Injuries

At the Royal Society of Medicine Sir Arthur Hurst opened a discussion on hysterical contractures following war injuries. In civil life contractures following injuries were comparatively rare but after war injuries were frequent. During the last war the nature of these contractures was much discussed but only toward the end did it become almost universally recognized that they were hysterical and could be quickly cured by proper treatment. The most common contracture followed injury to the soft parts of any type. Sometimes there was no wound, only a twist or a sprain. A limb was sometimes found completely stiff after amputation of a hammer toe or removal of a semilunar cartilage, but this was amenable to psychotherapy. The postures were of great variety. The commonest developed in the hand and were of two main kinds: with the fingers stiffened in extension or tightly flexed into the palm. One patient's hand was contracted for two and one-half years and, when cured at a single sitting and the hand was opened, the nails had grown deeply into the palm. Fixation of the wrist was infrequent; of the elbow, frequent; of the shoulder held tightly to the side, occasional. In a number of cases the toes were affected and the patient walked on the ball of the foot. The knee and the hip were often fixed. Immediately after the injury the patient adopted the most comfortable position and this might develop into a contraction. In some cases the limb was put into a splint and after its removal maintained the same position. The limb was fixed because the patient had lost the idea of movement. This could be prevented by putting the limb through complete movements when dressings were removed. Contractures were most likely when the patient was sent to the physical therapy department. Babinski made the mistake of concluding that contractures were reflex and therefore organic in origin and not hysterical. What led him to this was the remarkable trophic changes in patients with deficient circulation following disuse of a part. The skin became wrinkled, blue, thin and shiny and the finger nails gray and lusterless, grooved and brittle; the bones showed abnormal translucency. But all these changes, simulating the trophic changes following nerve injury, were simply the result of disuse and deficient circulation.

Treatment in the early days of the war consisted in a certain amount of suggestion and occasional hypnosis, but later Hurst and his colleagues found simpler methods of psychotherapy more valuable. The patients were not commonly hysterical and never had had "shell shock." Persuasion, manipulation and reeducation were found effective and the ideal patient was cured merely by telling him what to do. It was explained to him how the contracture developed, that it was necessary to rest the limb after the injury, but that when the splint and bandage were taken away the limb should be moved. The patient was taught to relax the limb, and the physician moved the affected part a little and allowed it to relax again.

In the discussion Dr. J. B. Mennell (physical therapist) said that if there was one condition more than another with which the physical therapist should not interfere it was these contractures. Unraveling them by force was a barbarous method and the contractures recurred. Colonel Henry Yellowlees (psychiatrist) did not find Hurst's one remark about the psychopathology—that the patient lost the idea of movement—satisfying. Hurst replied that the important thing was to get results. He believed that, if he ranged the ten medical officers who worked under him in order of their success, the one who would be last

or nearly last was the skilled psychotherapist. The worst cases of shell shock seen after the war of 1914-1918 were those which had been under the care of psychologists in France, who had carried out experiments in hypnotism with disastrous results. The president (Mr. Zachary Cope) remarked that Sir Arthur Hurst had stated that in some cases the joints could not be moved even under general anesthesia. Surely under deep anesthesia a joint not absolutely ankylosed would be movable. Hurst replied that he had seen a soldier whose knees were rigidly extended. He had had many spa treatments without improvement. Under a general anesthetic he did not relax, but under psychotherapy relaxation was gradually obtained. It was extremely difficult to explain such cases.

The Improvement of Bread

The Medical Research Council has issued a statement on the advantages of bread made from flour of higher extraction than that now in use. Flour should contain the germ of the wheat, as much as possible of the aleuron layer, and the finer portions of bran. Instead of consisting of about 70 per cent of the wheat grain, as at present, flour should contain from 80 to 85 per cent. The content of certain vitamins, all minerals and fat would thus be improved. This improvement would benefit most persons of small income whose power to purchase protective foods is limited. The minimum daily requirement of vitamin B₁ is from 300 to 500 international units. The pound loaf made from white flour of 70 per cent extraction gives from 80 to 160 units; from flour of 80 to 85 per cent extraction from 300 to 450 units, almost the total requirement. The Accessory Food Factors Committee of the Lister Institute and the Medical Research Council examined the ways in which the health of the people might be benefited by improving the value of wheaten bread and concluded that this change in one dietary essential alone would benefit greatly the health of children and adults of all classes. There would also be benefit from increase of other members of the B complex, such as riboflavin, and of vitamin E. The carotene (provitamin A) content would also be improved, if not previously destroyed by bleaching. The committee therefore condemns the bleaching of flour by oxidizing agents, such as nitrogen chloride and nitrogen peroxide. Increased fat content would be another benefit.

The total mineral content would be doubled. The daily requirement of iron may be taken as 10 mg. The pound loaf of 70 per cent extraction supplies only 5 mg. Anemia from iron deficiency is common among poorer women, especially in pregnancy, and among their infants. The daily requirement of calcium may be taken as 500 mg. The pound loaf of 70 per cent extraction contains less than 150 mg. Insufficiency of calcium is an important defect in the British diet but would not be compensated by increased extraction of flour. Bread is a poor source of calcium. The foods most rich in calcium are milk, cheese and green vegetables.

There are possible disadvantages from the increased extraction of flour. Flours of high extraction, if coarsely ground, are slightly less utilized than finer flour. For this reason 80 to 85 per cent extraction is recommended; it represents a fraction of the wheat grain in which improvement in the nutritive value of the flour is pronounced but in which decreased utilization has scarcely begun. But if a flour of 90 or even 100 per cent extraction could be obtained in finely ground condition, the nutritive advantages would be increased and the disadvantages of incomplete utilization would tend to disappear. Phytic acid precipitates calcium, so that it cannot be absorbed. Although high extraction flour contributes more calcium to the diet, it also contributes more phytic acid. Because of the need of more calcium in the British diet and its deficiency in bread, whatever the degree of extraction of the flour, the committee recommends the addition of calcium salts to bread, while at the same

time the foods rich in calcium should be promoted. The committee condemns the use of alkaline baking powder because it destroys the vitamin B₁ content of bread.

Provision for the Treatment of Air Raid Casualties

Speaking at a luncheon of the National Defense Public Interest Committee Mr. Malcolm MacDonald, minister of health, stated that there were now 1,800 fixed first aid posts in England and Wales, 800 mobile first aid posts, 14,000 ambulances and 15,000 ordinary cars waiting to carry sitting patients. The staff of the first aid section numbered about 100,000 persons. The Ministry of Health was also responsible for the treatment of all cases resulting from enemy action and for the hospital treatment of all but a small number of military casualties on any battle front in this country or outside. The organization passed its preliminary test at the time of the evacuation of Dunkirk, and the medical staff was astonished at the rapidity with which the patients recovered. That confirmed the high physical quality of our men and was also partly due, no doubt, to the excellent modern nursing and doctoring.

PLASMA TRANSFUSION ADOPTED

The recent suggestion to substitute for transfusion of whole blood plasma transfusion, because it is equally effective in cases of shock and is attended with less risk of reactions, has been adopted with good results. Mr. MacDonald stated that the plasma would keep indefinitely and so the call on blood donors had been reduced. But a further advance had been made. Plasma stored in bottles was not easily transportable. So by evaporation it was reduced to a white powder, by the addition of water to which the original liquid with all its properties could be reconstituted.

Marriages

RAYMOND LOUIS EVANS, Cincinnati, to Miss Augusta Dorrance Farnham of Wilkes-Barre, Pa., at Montrose, Pa., August 31.

DALE EMERSON BARBER, Oakland, Calif., to Miss Barbara Way of Washington, D. C., in San Francisco, August 24.

VICTOR R. KRUEGER, Bonduel, Wis., to Miss Blanche Lam-berton of Melrose, Minn., in Duluth, Minn., June 25.

THOMAS E. CANNING, Colville, Wash., to Miss Mary Lou Ralph of Spokane at Clark Ford, Idaho, August 3.

HENRY ANDREWS COTTON JR., Trenton, N. J., to Miss Anne Tooker at South Williamstown, Mass., August 31.

THEODORE SCHLOSSBACH, Ocean Grove, N. J., to Miss Eleanor Pegley Krause at Asbury Park, August 17.

SAMUEL BANCROFT FLUKE, Harrisburg, Pa., to Miss Florence Hardy of Washington, D. C., June 15.

VLADIMIR C. FLOWERS, Ithaca, N. Y., to Miss Alice Victoria Rex of Oak Park, Ill., August 31.

CLAUDE K. LINDLER to Miss Margaret Maxwell Ward, both of Columbia, S. C., August 24.

GEORGE M. KLITCH, Harrisburg, Pa., to Miss Ruthanna Mark of Hagerstown, Md., June 22.

JESSE J. HEATON, Tiffin, Ohio, to Miss Inez A. Johnson of McCutchenville, August 1.

JOSEPH DUDGEON WALKER to Mrs. Nannie Dunlap, both of Houston, Texas, July 25.

MARGARET PAXSON, Pottsville, Pa., to Mr. Harry F. Brian of Lancaster, August 17.

RAYMOND C. HACKER to Miss Florence A. Mease, both of Philadelphia, June 29.

LUDWIG J. O'BLAZNEY, Simpson, Pa., to Miss Wanda Faseski, August 31.

JAMES L. KING to Miss Helen Morrow, both of Florence, S. C., in August.

DONALD E. MORRISON, Penbrook, Pa., to Miss Alice Louise Gillan, June 12.

Deaths

Maude Elizabeth Seymour Abbott, Montreal, Que., Canada; University of Bishop College Faculty of Medicine, Montreal, 1894; honorary M.D., C.M., McGill University, 1910; formerly assistant professor of medical research and curator of the medical museum, McGill University Faculty of Medicine and lecturer of pathology from 1912 to 1923; was acting curator of the Canadian Army Medical Museum; professor of pathology and bacteriology at the Woman's Medical College of Pennsylvania, Philadelphia, from 1923 to 1925; member of the American Association of Anatomists and the American Association of Pathologists and Bacteriologists; permanent secretary-treasurer and one of the founders of the International Association of Medical Museums; editor of the *Journal of Technical Methods* and *Bulletin of the International Association of Medical Museums* from 1907 to 1938; managing editor of the "Osler Memorial Volume"; on the editorial board of the *Canadian Medical Association Journal*; author of "Classified Bibliography of Sir William Osler's Publications," "Atlas of Congenital Cardiac Disease" and "Historical Sketch of the Medical Faculty of McGill"; was awarded the degree of doctor of laws honoris causa from McGill University; aged 71; died, September 2, of cerebral hemorrhage.

Harold M. Hays ☉ New York; Columbia University College of Physicians and Surgeons, New York, 1905; instructor of otolaryngology at his alma mater from 1914 to 1922; associate professor of laryngology at the New York Polyclinic from 1914 to 1917; member of the American Academy of Ophthalmology and Otolaryngology and the American Laryngological, Rhinological and Otolological Society; fellow of the American College of Surgeons; past president of the American Federation of Organizations for the Hard of Hearing; founder, president and director of the New York League for the Hard of Hearing; served during the World War; director of the Hebrew Association for the Deaf; was president of the Association of Private Hospitals of Greater New York; medical director of the Park East Hospital and the Park West Hospital; consulting otologist to the Convalescent Home of Hebrew Children, Rockaway Park, and St. Joseph Hospital, Far Rockaway; consulting laryngologist to the Sing Sing Prison Hospital, Ossining; author of "Diseases of Nose, Throat and Ear" and "Modern Conception of Deafness"; aged 59; died, August 20, of coronary thrombosis.

Charles Francis Nassau ☉ Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1891; Jefferson Medical College of Philadelphia, 1906; clinical professor of surgery at the Jefferson Medical College; past president of the Philadelphia County Medical Society; honorary president of the John Chalmers Da Costa Foundation; fellow of the American College of Surgeons; formerly director of public health of Philadelphia; served during the World War; chief surgeon, Frankford Hospital; surgeon, St. Joseph's Hospital and Girard College; assistant surgeon, Jefferson Hospital; consulting surgeon, Mount Sinai Hospital, Kensington Hospital for Women and Rush Hospital for Consumption and Allied Diseases, Philadelphia, and the Pottstown (Pa.) Hospital; aged 71; died, August 11, in the Easton (Pa.) Hospital of coronary occlusion.

John Crean Cardwell, Brooklyn; University of the City of New York Medical Department, 1888; member of the Medical Society of the State of New York; instructor in physiology at Harvard Medical School, Boston, from 1891 to 1893; instructor in physiology at the Long Island College Hospital from 1900 to 1904, lecturer from 1904 to 1908, assistant professor from 1908 to 1910, adjunct professor 1910-1911, associate professor from 1911 to 1913, professor of physiology and acting professor of pharmacology from 1919 to 1928, professor of physiology and pharmacology from 1928 to 1930 and since 1932 emeritus professor; member of the American Association of Anatomists; aged 74; died, August 3.

Larkin Smith ☉ Nashville, Tenn.; University of Nashville Medical Department, 1888; Vanderbilt University School of Medicine, Nashville, 1889; demonstrator of histology, pathology and microscopy from 1889 to 1898, professor of hygiene and preventive medicine, associate professor of pathology from 1909 to 1915, instructor in medicine from 1915 to 1925 and instructor in clinical medicine from 1925 to 1928 at the Vanderbilt University School of Medicine; at one time secretary of the Tennessee State Medical Association; formerly health officer of Nashville; served during the World War; formerly on the staff of the Vanderbilt Hospital; aged 74; died, July 17, of pernicious anemia and diabetes mellitus.

James McKenty, Winnipeg, Man., Canada; Queen's University Faculty of Medicine, Kingston, Ont., 1890; served at various times as lecturer in anatomy, assistant professor in clinical medicine, associate professor of surgery and emeritus professor of surgery at the University of Manitoba Faculty of Medicine; was president of the Winnipeg Medical Society; fellow of the American College of Surgeons; for many years on the staffs of St. Boniface, Misericordia and St. Joseph's hospitals; aged 74; died, August 11, of cerebral hemorrhage.

Robert Kingman, Brooklyn; Long Island College Hospital, Brooklyn, 1899; formerly clinical instructor in neurology at his alma mater; past secretary and vice president of the Brooklyn Neurological Society; served as New York State Examiner in Lunacy, and New York State Examiner of Mental Defectives; was consulting neuropsychiatrist in the United States Public Health Service hospitals; on the staff of the Kings County Hospital and the Greenpoint Hospital; aged 64; died, August 7, of coronary thrombosis.

John Archer Hatchett, Oklahoma City; Missouri Medical College, St. Louis, 1884; member of the House of Delegates of the American Medical Association, 1905-1906, and Second Vice President in 1908; member of the Oklahoma State Medical Association; past president of the Oklahoma County Medical Society; professor emeritus of obstetrics at the University of Oklahoma School of Medicine; at one time on the staff of the University Hospital; aged 87; died, August 16, of arteriosclerosis and pneumonia.

Howard Leighton Updegraff ☉ Los Angeles; University of Nebraska College of Medicine, Omaha, 1919; fellow of the American College of Surgeons; honorary member of the Royal Australasian Medical Society; member of the Society of Plastic and Reconstructive Surgery; on the staffs of the Hollywood Presbyterian, Cedars of Lebanon, Orthopedic and Methodist hospitals; associate editor of the *American Journal of Surgery*; aged 43; died, August 8, of acute hemorrhagic pancreatitis.

Augustus Thorndike, Boston; Harvard Medical School, Boston, 1888; member of the Massachusetts Medical Society; past president of the American Orthopedic Association; formerly instructor of orthopedics at his alma mater; at one time assistant visiting surgeon to the House of the Good Samaritan and assistant surgeon to the Children's Hospital; author of "A Manual of Orthopedic Surgery," published in 1907; aged 77; died, August 23, in Bar Harbor, Maine, of heart disease.

Joseph Brock Harrison ☉ Westfield, N. J.; College of Physicians and Surgeons, medical department of Columbia College, New York, 1876; for many years member of the board of education and president of the board of health; past president of the Union County Medical Society; on the courtesy staff of the Muhlenberg Hospital, Plainfield, and the Elizabeth (N. J.) General Hospital; aged 88; died, August 25, of uremia, hypertrophy of the prostate and myocarditis.

Anson James Singer, East Stroudsburg, Pa.; University of the City of New York Medical Department, 1883; member of the Medical Society of the State of Pennsylvania; past president of the Monroe County Medical Society; was president of the board of trustees of the State Teachers College; one time mayor; formerly on the staff of the General Hospital of Monroe County; aged 82; died, July 29.

Walter Alonzo Bartlett, Manchester, N. H.; Dartmouth Medical School, Hanover, 1911; member of the New Hampshire Medical Society; formerly member of the board of education; on the staff of the Hillsborough County General Hospital, Grasmere, and the Sacred Heart Hospital; aged 50; died, August 12, in the New Hampshire State Sanatorium, Glencliff, of pulmonary tuberculosis.

William Henry Howell ☉ Altoona, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1899; fellow of the American College of Surgeons; past president of the Blair County Medical Society; on the staff of the Altoona Hospital and Mercy Hospital; aged 67; died, August 13, in the Annie M. Warner Hospital, Gettysburg, of cerebral hemorrhage.

Arthur Lloyd Chambers ☉ New York; New York Homeopathic Medical College and Flower Hospital, New York, 1914; associate professor of ophthalmology at his alma mater; fellow of the American College of Surgeons; on the staffs of the New York Ophthalmic Hospital, Flower and Fifth Avenue hospitals and the Metropolitan Hospital; aged 51; died, August 14.

Thomas Albert Sinclair, Houston, Texas; Keokuk Medical College, College of Physicians and Surgeons, Keokuk, Iowa, 1905; member of the State Medical Association of Texas; medical superintendent of the Heights Clinic-Hospital; aged 67;

member of the city health department from 1920 to 1928; died, July 26, of heart disease.

Henry LeBaron Peters ♂ Bridgeport, Conn.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1907; for many years medical examiner of Bridgeport; attending physician and director of the pathologic and bacteriologic laboratory of the Bridgeport Hospital; aged 58; died in August of coronary thrombosis.

William Joseph Leonard, Provincetown, Mass.; College of Physicians and Surgeons, Baltimore, 1896; served during the World War; formerly police department surgeon and city physician of Springfield; at one time on the staffs of the Mercy Hospital and the City of Springfield Infirmary, Springfield; aged 70; died, July 25.

Bleeker James Knapp ♂ Evansville, Ind.; Rush Medical College, Chicago, 1901; member of the American Academy of Ophthalmology and Oto-Laryngology; fellow of the American College of Surgeons; aged 63; surgeon to the Protestant Deaconess Hospital, where he died, August 20, of chronic nephritis and uremia.

Ralph Harpel Dunlap, Bellevue, Pa.; Johns Hopkins University School of Medicine, Baltimore, 1919; member of the Medical Society of the State of Pennsylvania; on the staff of St. John's General Hospital, Pittsburgh, and the Salvation Army Woman's Home and Hospital; aged 48; died, August 8.

Maximilian Joseph Kern, St. Cloud, Minn.; John A. Creighton Medical College, Omaha, 1904; member of the Minnesota State Medical Association; for many years county coroner, and member of the city council; aged 59; died, August 10, of hypertension and cerebral hemorrhage.

Elisha C. Chew ♂ Atlantic City, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1891; past president of the Atlantic County Medical Society; formerly police surgeon; on the staff of the Atlantic City Hospital; aged 73; died, August 5, of chronic fibroid phthisis.

Joseph Montgomery Casey, Fort Madison, Iowa; Rush Medical College, Chicago, 1888; member of the Iowa State Medical Society; aged 75; on the staff of the Sacred Heart Hospital and the Atchison, Topeka and Santa Fe Railway Hospital, where he died, July 30, of myocarditis.

Warren Bunting Shaner, Pottstown, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1882; member of the Medical Society of the State of Pennsylvania; for many years on the staff and secretary of the staff of the Pottstown Hospital; aged 80; died, July 15.

Edward H. White ♂ Cumberland, Md.; Baltimore Medical College, 1899; past president of the Allegany and Garrett Counties Medical Society; at one time city and county health officer; on the staffs of the Allegany and Memorial hospitals; aged 70; died, July 13.

Robert Edward Lee Thacker ♂ Lexington, Okla.; University of Louisville (Ky.) Medical Department, 1893; served during the World War; aged 74; died, July 10, in the Wesley Hospital, Oklahoma City, of hypertensive heart disease and prostatic hypertrophy.

William Wilberforce Farr, Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1887; served during the World War; aged 75; died, August 19, in the Germantown Dispensary and Hospital of bronchopneumonia and diabetes mellitus.

Napoleon Gustavus Gewinner, Macon, Ga.; Medical College of the State of South Carolina, Charleston, 1879; member of the Medical Association of Georgia; aged 82; died, August 19, in Atlanta of acute intestinal obstruction and mesenteric thrombosis.

Henry Grady Lassiter ♂ Weldon, N. C.; Jefferson Medical College of Philadelphia, 1918; past president of the Halifax County Medical Society; aged 48; died, August 1, in the Roanoke Rapids (N. C.) Hospital of cerebral hemorrhage and hypertension.

William Hugh Hamley, Lake Providence, La.; University of Tennessee College of Medicine, Memphis, 1914; member of the Louisiana State Medical Society; served during the World War; aged 51; died, August 6, in Vicksburg, Miss., of cirrhosis of the liver.

William Albert Jolley, North Little Rock, Ark.; Jefferson Medical College of Philadelphia, 1896; member of the American Psychiatric Association; served during the World War; on the staff of the Veterans Administration Facility; aged 68; died, August 2.

Arthur Clinton Hendrick, Toronto, Ont., Canada; University of Toronto Faculty of Medicine, 1900; fellow of the American College of Surgeons; on the staff of the Toronto General Hospital and the Grace Hospital; aged 66; died, August 1.

Willet W. Binion, Benevolence, Ga.; Atlanta Medical College, 1885; member of the Medical Association of Georgia; for many years member of the county board of education; aged 80; died, August 13, of chronic nephritis and arteriosclerosis.

William Henry Lehner, Brentwood, Pa.; Western Pennsylvania Medical College, Pittsburgh, 1895; member of the Medical Society of the State of Pennsylvania; formerly on the staff of the Southside Hospital, Pittsburgh; aged 76; died, July 21.

Ellen Elizabeth Brown, Graterford, Pa.; Woman's Medical College of Pennsylvania, Philadelphia, 1881; member of the Medical Society of the State of Pennsylvania; for many years on the staff of the Chester (Pa.) Hospital; aged 91; died, July 29.

Lawrence Alvies Mendonsa, St. Louis; St. Louis College of Physicians and Surgeons, 1906; member of the Missouri State Medical Association; secretary of St. Louis County Medical Society; aged 58; died, July 17, in the Central Hospital.

Jacob S. Thompson, Stephens, Ark.; University of Louisville (Ky.) Medical Department, 1882; past president of the Ouachita County Medical Society; at various times president of the school board and bank president; aged 83; died, July 10.

Friedrich Schiff, New York; Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin, Prussia, 1913; member of the Medical Society of the State of New York; bacteriologist on the staff of the Beth Israel Hospital; aged 51; died, July 30.

Job Thigpen Cater, Montgomery, Ala.; Rush Medical College, Chicago, 1930; member of the Medical Association of the State of Alabama and the Association for Research in Ophthalmology; aged 39; died, July 3, in the Hubbard Hospital.

Harry Douglas Thompson ♂ Beverly Hills, Calif.; College of Physicians and Surgeons, Los Angeles, 1918; on the staff of the Presbyterian Hospital-Olmsted Memorial, and chairman of the library committee; aged 48; died, July 3.

John Calvin Simon, Cleveland; Eclectic Medical Institute, Cincinnati, 1889; formerly county coroner; on the staff of the Grace Hospital and St. John's Hospital; aged 73; died, August 6, in Olmsted Falls, Ohio, of coronary occlusion.

Nicholas R. Engels, Chicago; Rush Medical College, Chicago, 1896; member of the Illinois State Medical Society; on the staff of St. Bernard's Hospital; aged 76; died, August 11, of cerebral hemorrhage and arteriosclerosis.

Alphonse Lagaci, Franklin, N. H.; M.B., School of Medicine and Surgery of Montreal, Faculty of Medicine of the University of Laval at Montreal, 1907, and M.D. in 1909; for many years mayor; aged 58; died, July 26.

James Garrity ♂ Chicago; Rush Medical College, Chicago, 1904; aged 60; for many years on the staff of the West Suburban Hospital, Oak Park, Ill., where he died, August 31, of injuries received in an automobile accident.

Lawrence Robert Harris, Galveston, Texas; University of Texas School of Medicine, Galveston, 1907; member of the State Medical Association of Texas; aged 57; died, August 6, of pulmonary edema and chronic nephritis.

James Anderson Gessing, Oak Park, Ill.; National Medical College, Chicago, 1897; member of the Illinois State Medical Society; aged 71; died, August 22, in the West Suburban Hospital of chronic myocarditis.

William Tone McMannis, New York; College of Physicians and Surgeons, medical department of Columbia College, New York, 1885; member of the Medical Society of the State of New York; aged 76; died, July 14.

Charles Leonard Randall, Salamanca, N. Y.; University of Buffalo School of Medicine, 1895; formerly county coroner and school physician; served during the World War; aged 73; died, July 27, of coronary thrombosis.

John Louis Hoffman ♂ Ashland, Pa.; University of Pennsylvania Medical Department, 1886; served during the World War; aged 76; died, August 11, in the Ashland State Hospital of myocarditis and arteriosclerosis.

Bernard DeKoven, Chicago; Columbia University College of Physicians and Surgeons, New York, 1904; aged 63; died, August 11, in the Michael Reese Hospital of myocarditis and chronic myelogenous leukemia.

Julius Wesley Hill, Richmond, Ky.; University of Louisville Medical Department, 1905; member of the Kentucky State Medical Association; aged 60; died, August 17, of arteriosclerosis and chronic nephritis.

Fanny Elizah Shutts, Los Angeles; Hahnemann Medical College of the Pacific, San Francisco, 1916; for many years member of the city health department; aged 65; died, July 5, in the Roosevelt Sanitarium.

Robert Ziegmond Garber, Ann Arbor, Mich.; University of Michigan Medical School, Ann Arbor, 1938; aged 26; died, August 6, in the University Hospital of pulmonary and intestinal tuberculosis.

Uriel Pierce Haw, Benton, Mo.; Vanderbilt University School of Medicine, Nashville, Tenn., 1898; member of the Missouri State Medical Association; aged 67; was shot and killed, July 23.

Isaac Newton Adams, Pineville, La.; Memphis (Tenn.) Hospital Medical College, 1901; member of the Louisiana State Medical Society; served during the World War; aged 63; died, July 25.

John Palmer Hollenback, New York; Creighton University School of Medicine, Omaha, 1937; resident surgeon on the staff of the Lenox Hill Hospital; aged 28; was found dead, July 21.

Bernard Reamy Le Roy, Stoutsville, Ohio; Western Reserve University Medical Department, Cleveland, 1885; veteran of the Spanish-American War; aged 80; died in July.

John A. Brady, Louisville, Ky.; University of Louisville (Ky.) Medical Department, 1893; served during the World War; aged 69; died, July 11, in the Kentucky Baptist Hospital.

Max Rosebery, New York; College of Physicians and Surgeons, medical department of Columbia College, New York, 1892; served during the World War; aged 71; died in July.

George Gordon Griffith, Spurgeon, Ind.; University of Louisville (Ky.) Medical Department, 1913; member of the Indiana State Medical Association; aged 50; died, July 3.

John Albert Reese, Detour, Mich.; University of Michigan Homeopathic Medical School, Ann Arbor, 1906; member of the Michigan State Medical Society; aged 60; died, July 15.

Joseph Clyde McCartney, Pelotas, Brazil; Medico-Chirurgical College of Philadelphia, 1886; also a dentist; aged 80; died, June 24, at sea while aboard the *S. S. Brazil*.

James Bray Bradley, Eaton Rapids, Mich.; Rush Medical College, Chicago, 1886; member of the Michigan State Medical Society; at one time mayor; aged 81; died, July 4.

William Wesley Hall, McLeansboro, Ill.; Rush Medical College, Chicago, 1883; member of the Illinois State Medical Society; aged 78; died, August 17, of carcinoma.

Thomas Richard Butler, Lexington, Mo.; Bellevue Hospital Medical College, New York, 1885; member of the Missouri State Medical Association; aged 77; died, July 4.

Llewelyn David Roberts, Hamilton, Mont.; Tulane University of Louisiana School of Medicine, New Orleans, 1938; aged 30; died, July 12, of chronic endocarditis.

Ernest Eugene Thompson, Red Bluff, Calif.; Cooper Medical College, San Francisco, 1900; member of the California Medical Association; aged 64; died, July 18.

John Camden Cochran, St. Marys, Pa.; Dartmouth Medical School, Hanover, N. H., 1890; Jefferson Medical College of Philadelphia, 1890; aged 84; died, July 18.

William E. Ford, Arlington, Va.; Maryland Medical College, Baltimore, 1909; served during the World War; aged 59; died, August 14, of diabetes mellitus.

Elmer C. Bond, Hanford, Calif.; California Medical College, San Francisco, 1899; member of the California Medical Association; aged 66; died, July 8.

Joseph David Michie ♂ Childress, Texas; Fort Worth School of Medicine, Medical Department of Fort Worth University, 1898; aged 67; died in July.

John Joseph Whoriskey ♂ Boston; Harvard Medical School, Boston, 1899; on the staff of St. Elizabeth's Hospital; aged 64; died, July 26, in Scituate.

Henry B. Gifford, Juda, Wis.; Rush Medical College, Chicago, 1883; aged 82; died, July 15, in Monroe of cerebral hemorrhage and chronic arthritis.

Ward Watson Wiers, Royal Oak, Mich.; Detroit College of Medicine, 1911; member of the Michigan State Medical Society; aged 64; died, July 13.

Louis William Rehbein, Los Angeles; Jefferson Medical College of Philadelphia, 1901; aged 68; died, July 13, of cerebral hemorrhage and arteriosclerosis.

Purvis Alexander Spain, Brooklyn; University and Bellevue Hospital Medical College, New York, 1899; aged 67; died, July 13, in the Wade Hospital.

B. Frank Eckman, Coral Gables, Fla.; Medical College of Ohio, Cincinnati, 1890; member of the Florida Medical Association; aged 72; died, July 9.

Israel Goldstein, Brooklyn; Columbia University College of Physicians and Surgeons, New York, 1922; aged 43; died, August 3, of angina pectoris.

George Walter Harding, Warsaw, Ind.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1886; aged 81; died, July 25.

Elbert Earl Freeman, Greentown, Ind.; Hering Medical College, Chicago, 1908; aged 59; died, August 11, of purpura haemorrhagica.

Edward Laughton Quirk, Aylmer (East), Que., Canada; McGill University Faculty of Medicine, Montreal, 1888; died about June 15.

William Patterson, Montreal, Que., Canada; University of Bishop College Faculty of Medicine, Montreal, 1884; aged 92; died, June 29.

William Frank Alvey, Louisville, Ky.; Chattanooga (Tenn.) Medical College, 1898; served during the World War; aged 67; died, July 29.

Oran Newton, Taft, Calif.; California Eclectic Medical College, Los Angeles, 1910; formerly health officer; aged 57; died, July 22.

Charles Augustus Ruffin ♂ Louisville, Ohio; University of Wooster Medical Department, Cleveland, 1906; aged 60; died, July 30.

William Franklin Markley, Follett, Texas; University of Kansas School of Medicine, Kansas City, Kan., 1906; aged 66; died, July 9.

Hilborn Wilton Harris ♂ Canton, Mo.; Missouri Medical College, St. Louis, 1888; aged 76; died, August 12, of coronary thrombosis.

George E. Kerns, Galion, Ohio; Eclectic Medical Institute, Cincinnati, 1903; aged 67; died, August 13, in Cleveland of pneumonia.

Arthur Philip Damerow ♂ Englewood, Colo.; University of Colorado School of Medicine, Denver, 1927; aged 40; died, June 5.

Joseph Aloysius Duffey ♂ Cincinnati; Eclectic Medical College, 1913; served during the World War; aged 49; died, July 9.

William F. Kellogg, Ethridge, Tenn.; University of the South Medical Department, Sewanee, 1898; aged 81; died, July 3.

Percy Leroy Jones, Lenexa, Kan.; Eclectic Medical Institute, Cincinnati, 1905; aged 62; died, June 26, of pneumonia.

James Addison Bell, Decatur, Ga.; Louisville (Ky.) Medical College, 1905; aged 59; died, July 7, of coronary disease.

Albert Jerome Britt, Philadelphia; Jefferson Medical College of Philadelphia, 1893; aged 68; died, July 26, in Rydal.

Mark Neumann, San Francisco; University of the City of New York Medical Department, 1880; aged 83; died, May 17.

Wilfred Joseph Heringer, Port Arthur, Ont., Canada; Manitoba Medical College, Winnipeg, 1913; died, June 30.

Robert a'Beckett Stephenson, Inglewood, Calif.; Rush Medical College, Chicago, 1903; aged 65; died, May 17.

James A. Delaney, Bristol, Tenn.; Hospital College of Medicine, Louisville, Ky., 1895; aged 70; died, July 23.

George Lyman Woods, Knoxville, Tenn.; Medical School of Maine, Portland, 1879; aged 90; died, July 28.

Alonzo Bittle Curtis, Lower Peach Tree, Ala.; Medical College of Alabama, Mobile, 1882; died, July 23.

Oliver I. Hess, Scottsdale, Pa.; Kentucky School of Medicine, Louisville, 1894; aged 86; died, July 9.

J. M. Parks, Elkhart, Texas (licensed in Texas, under the act of 1907); aged 84; died, July 16.

John C. Luke, Ocilla, Ga.; Louisville (Ky.) Medical College, 1893; aged 70; died, July 1.

R. Pierce White, Stovall, Ga.; Atlanta Medical College, 1884; aged 80; died, July 18.

Bureau of Investigation

DARK AGES STILL WITH US
Seven U. S. Post Office Fraud Orders Against
"Cure-Alls"

There can be no such remedy as a "cure-all." By this time every one ought to know that not even sulfanilamide is a panacea. Nevertheless, some concerns still find it profitable to advocate a remedy or a line of remedies for the treatment of practically everything. There is evidence to indicate that one

files of the Bureau of Investigation. At this late date however it is hoped that, since these remedies have their appeal only to the unintelligent, these promotions are not of sufficient importance to warrant separate articles in the pages of a scientific publication.

The group of seven were subjects of fraud orders issued during the past year and serve to illustrate the extent to which such promoters carry on their activities and also to illustrate the laudable action of the Post Office Department in these cases. Table 1 gives the name and location of each firm and the names of the remedies which were promoted, while table 2 indicates the conditions in which these remedies were advo-

TABLE 1.—*Fraud Orders Referred to in This Article*

Names of Individuals and Companies	Location	Remedies Named	Date of Issue	Order Number
Arrowhead Indian Herbs Company... Dewey Conway, Jodie Conway	Chico, Calif.	Remedy No. 19-D; No. 28-D; No. 138-D; No. 240-D; No. 297-D; No. 6-D; No. 7-D; No. 14-D; No. 104-D; No. 29-L	July 20, 1940	14417
Botanical Medicine Company..... Dr. W. B. Goebel	Kannapolis, N. C.	Gall Bladder Special; Pyorrhea Treatment; Trifolium; Lav-I-Ton; Ironite; Black Spirit; Femdyne; Ey-No-La; Hem-I-Rin; Kre-Cal	Jan. 22, 1940	13700
Crocker's Asthma & Lung Trouble Medicine Company James Crocker	Indianapolis	Drinking Water No. 29; Syrup No. 377; Ten No. 370	Jan. 29, 1940	13723
H. W. Lange & Son..... Lange & Son F. W. Lange	Portland, Ore.	Lang's Mineral Wonder; Lang's Mineral Ointment; Lang's Female Suppositories	May 8, 1940	14112
Morehead & Co. E. H. Morehead & Co.	Denver	Rocky Mountain Mineral Wonder; Mineral Wonder Laxative	Feb. 12, 1940	13773
Prof. C. A. Isbell.	Colfax, Calif.	Isbell's Mineral	July 15, 1940	14349
Theodore M. Moore..... Prof. Theodore M. Moore	Davenport, Iowa	Big 4 Wonders Indian Remedies; Spirit Luke Salts; Big 4 Wonders Iron Tonic; Black Bath Mineral; X X White, Mineral; Stomach Capsules; Vaginal Suppositories; Mineral Laxatives	Dec. 4, 1939	13576

TABLE 2.—*Résumé of Fraudulent "Cure-Alls," Referred to in This Article*

Name of the Promoter of the Remedies	Diseases for Which the Remedies Were to Be Used																Other Conditions Specifically Mentioned in the Advertisements	
	Apparently Any Al- liment or Disorder	Asthma	Anemia	Bladder Diseases	Cancer	Diabetes	Eye Diseases	Female Disorders	Hemorrhoids	High Blood Pressure	Kidney Diseases	Malaria	Piles	Pyorrhea	Rheumatism	Sores		Stomach Troubles
Arrowhead Indian Herbs.....	X																	Gallbladder troubles, gallstones
Botanical Medicine Co.....	..	..	x	x	..	x	x	x	x	x	x	..	x	x	x	x	x	Diphtheria, dropsy, lung trouble, loss of manhood, menopause
Crocker's Asthma and Lung Trouble Medicine Co.	..	x	..	..	x	x	..	..	..	x	..	..	..	..	..	..	..	Abscesses, adenoids, bronchitis, diarrhea, earache, leukorrhea, delayed and painful menstruation, nasal catarrh, nervousness, neu- ritis, ovary troubles, tonsils, fall- ing womb
H. W. Lange & Son.....	..	..	x	..	..	..	x	x	..	..	..	..	..	..	x	..	..	Loss of hearing, gallstones, gas- tritis, skin diseases, running sores, all tumors
Morehead & Co.....	X	x	x	x	..	x	..	x	x	x	x	x	x	..	x	..	x	Blood purifier, constipation, eczema, "social" diseases
Prof. C. A. Isbell.....	..	..	..	..	x	x	..	..	..	..	..	..	x	x	x	x	x	Deafness, failing eyesight, paral- ysis, sleeping sickness, tuberculosis, insanity, syphilis
Theodore M. Moore.....	X	x	..	x	x	x	..	x	x	x	x	x	x	..	x	..	..

promoter who at various times seems to have interested himself in some of the above-named products, was apparently not satisfied with the extent of this fraud and included in his advertising some of the old Albert Abrams hokum: "A Complete Blood Test—Radio-Electronic Diagnosis and Treatments." "One Drop of Your Blood" said he, would reveal whether you had "cancer, tuberculosis, blood infections or other ailments" and whether these conditions would be "curable or incurable" in your case.

Much more in the way of history of some of the concerns named in the tables could be developed in this article from the

cated. Of special note are those which were apparently promoted for any ailment or disorder as well as those which were suggested as remedies for diabetes, diphtheria, tuberculosis, sleeping sickness, insanity and syphilis.

The Post Office Department is to be commended for refusing the use of the United States mails to these concerns. It is to be hoped that all other such remedies will be subjects of similar fraud orders issued at an early date. It is also to be hoped that whatever portion of the American public comprises the purchasers of these remedies will soon be educated to the point where the sale of such items reaches absolute zero.

Correspondence

SERUM CENTER IN IOWA

To the Editor:—My attention has been called to an item in THE JOURNAL of August 10 under Queries and Minor Notes, page 480, on convalescent serum for contagious diseases. In referring to sources of convalescent serum the State of Iowa Department of Health is not mentioned.

I therefore wish to add that in 1937 the State of Iowa Department of Health organized its serum center for the processing of human immune serum. Since its organization the Serum Center has distributed a total of 213,000 cc. of human serum. Of this amount 23,655 cc. has been distributed for measles, 135,490 cc. for scarlet fever and 42,980 cc. for poliomyelitis. Lesser amounts have been processed for Rocky Mountain spotted fever, pertussis and tularemia. The convalescent serum is sent to licensed physicians on request without charge. When the economic status of the patient permits, a contribution is accepted to the donor's fund. Donors are paid \$5 for 250 cc. of blood. The attending physician is expected to send a complete clinical report of all cases in which the convalescent serum is used. The serum center is at present also processing human serum for transfusion purposes in accordance with the procedure of Carlson and Levinson. The State of Iowa Department of Health is the one state department at the present time processing convalescent serum.

The Serum Center was properly licensed by the Federal Security Agency, National Health Institute, Division of Biologics Control in September 1939. At that time the license granted interstate traffic to measles, scarlet fever and poliomyelitis human immune serum and normal human serum. Later, in May 1940, the license was extended to include pertussis immune serum.

WALTER L. BIERRING, M.D., Des Moines, Iowa.

Commissioner, State of Iowa Department of Health.

HEALTH SERVICE SYSTEM OF SAN FRANCISCO

To the Editor:—In THE JOURNAL (August 17, p. 540) under the heading Organization Section, you carry an article on the health service system of San Francisco.

Your readers should know that the statements and statistics in this article are taken from a pamphlet prepared by the lay board that operates the system. The physicians who actually perform the services under the system (over 95 per cent of whom are members of the San Francisco County Medical Society) presented an analysis of the report in the May 1940 issue of the *Bulletin of the San Francisco County Medical Society*.

It is important for your readers to note that the chief complaint of the physicians has not been that the value of the unit was too low. It has been that the system has been conducted in an arbitrary manner, with very slight attempts on the part of the director to cooperate with the county medical society. The official manager's report conceals the fact that in 1939 the physicians actually contributed more than \$132,000 worth of medical services without remuneration, this sum being based on the modest schedule in effect during that year. It is readily admitted that the employees called for an unreasonably large amount of medical service. Nevertheless, if the visits and services actually made (but arbitrarily disallowed) were included in the computation of the unit paid, it would reveal the fact that the doctors were paid about 50 cents on the dollar.

The physicians of San Francisco are happy to cooperate with any constructive voluntary health insurance system in the operation of which they have a proper voice. They do believe, however, that the true facts should be known, since faulty conclusions could easily be drawn from the figures you publish.

L. HENRY GARLAND, M.D., San Francisco.

Secretary, San Francisco County Medical Society.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

"METAL FUME FEVER" IN WELDERS

To the Editor:—My attention has been called to a condition of vertigo, profuse perspiration, dyspnea and rapid pulse suffered by men using the electric welding apparatus on galvanized material at the Pearl Harbor Navy Yard. Recently several patients have consulted me primarily for a nasal congestion and a wet nose together with some vertigo and ocular instability. They all gave the history of having worked either as an electric welder or in close connection with this kind of work. I am wondering if there is a possibility that these patients are suffering from a poisonous effect from the gas generated by such a job. Have you anything in your files concerning this type of poisonous gas and if so would you please send me a digest of it or tell me where it can be found?

M.D., Honolulu, T. H.

ANSWER.—A considerable number of cases of metal fume fever have been reported in past years among welders engaged in the welding or cutting of galvanized steel in naval vessels, particularly in confined spaces. The condition now is comparatively infrequent owing to the efficiency of the protective measures which have been introduced.

The galvanized coating is basically zinc and contains from 95 to 96.5 per cent of that metal. It also contains from 0.75 to 1 per cent of lead and from 2.5 to 4 per cent of iron. Metal fume fever results from the inhalation of zinc oxide fumes incident to the welding or the cutting of the metal, lead being present in such traces as to be apparently negligible.

Metal fume fever has long been recognized as an industrial disease. Other terms commonly applied to the condition are brass foundry's ague, brass chills and zinc fever. At one time it was of common occurrence among brass foundry and zinc smelting workers. Generally attacks today are found as a result of welding or cutting of galvanized sheets and pipes.

It is an acute, transitory, nonfatal disease causing slight or temporary disability. A strict interpretation of the term metal fume fever does not place it in the class of conditions termed metal poisoning. The reaction set up in the body is not directly ascribed to the toxic metal or dependent on the inherent toxicity of the metal particles inhaled. The superficial action of the inhaled finely divided zinc oxide injures the epithelial cells lining the respiratory tract. The absorption of the altered proteins of these cells affects the individual much the same as the typhoid inoculation or the injection of other foreign protein.

At the end of the day, or from two to twelve hours following exposure to the zinc fumes, the worker notices a dryness of the throat in addition to a metallic taste which most workers commonly report during exposure. There is usually a feeling of tightness of the chest, varying with the exposure. This tends to indicate the severity of chills and fever which are to follow. Occasionally nausea and vomiting occur. When mildly affected the patient may not be aware of any fever and complain only of a chilly sensation followed by sweating and general weakness. Exposure to extreme cold may hasten the onset of the fever and chills, but as a rule the worker awakens from sleep with a high temperature and chills, which are quite similar to the chills and fever experienced in attacks of malaria. Toward the end of the attack the individual sweats profusely and is left with a feeling of weakness. In the majority of cases some weakness is still felt the next day. The time loss, however, is rarely beyond one day.

Metal fume fever may sometimes be overlooked unless the physician considers the occupational environment. It may simulate attacks of grip or bronchitis or, if in a malarial region, it may be mistaken for an attack of malaria. Continued work

produces an immunity or raises resistance, but this is lost after a layoff from work.

There appears to be no conclusive evidence that chronic effects are produced by repeated exposure to zinc fumes.

The prevention of metal fume fever in welding is accomplished in naval vessels by means of localized exhaust, the fumes being removed at the source. A light metal pipe approximately $3\frac{1}{2}$ inches in diameter connected to an exhaust blower serves to remove the bulk of the zinc fumes at the line of the weld. This is carried along with the work from place to place. In addition, respirators are provided for special protection under unusual circumstances. Ordinarily the localized exhaust, if used in compliance with instructions, is adequate to prevent metal fume poisoning.

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ULTRAVIOLET RAYS FOR AIR STERILIZATION IN AIR CONDITIONING SYSTEMS

To the Editor:—There has been considerable discussion concerning the use of ultraviolet rays in air conditioning systems for sterilizing the air, particularly because in many systems in which the air is cooled approximately 75 per cent is recirculated from the cooled space, with the possibility that it might carry bacteria. Ultraviolet rays, if used, would be introduced into the recirculated air path, where the velocity may be as high as 1,000 feet per minute. There is a question as to whether such an arrangement would be effective and also a question as to the results that might be accomplished with ultraviolet rays even though the velocity of the air passing the ultraviolet source is not so great. Any information you can supply concerning this matter would be appreciated.

M.D., Wisconsin.

ANSWER.—Wells, investigator of air-borne bacteria and ultraviolet rays for bactericidal purposes, in a recent publication (*J. Franklin Inst.* 229:347 [March] 1940) provides much information dealing with the points raised in this query. In a smooth tunnel 100 feet long, the other dimensions being 7 by 8 feet, a standard ultraviolet lamp was set up near the center. At the air entry end of the tunnel, *Escherichia coli* cultures were sprayed into the atmosphere. Various determinations were made as to the killing action of ultraviolet emanations under various conditions, including velocity, humidity and nearness to the lamp. At a velocity of 222 feet per minute and a relative humidity of 43 per cent, when the bacterial count prior to ultraviolet action was 1,250 per sample, a drop to 303 bacteria occurred after passing the rays. At a velocity of 21 feet and a relative humidity of 67 per cent, the count before exposure of 42,000 bacteria dropped to 12,500 after action of the rays.

In another publication (*Am. J. Pub. Health* 29:863 [Aug.] 1939) Wells and his associates report some bacterial counts made in an air conditioned railway car with and without the action of ultraviolet rays in the air conditioning. On this car the passenger load varied from one to sixty-nine. With the ultraviolet rays turned off and a passenger load of one, the total bacteria count was 232. When the passenger load was sixty-nine the bacterial count was 1,324. When the ultraviolet rays were operating, at a time when the passenger load was fifteen, the lowest reported in this particular series of experiments, the bacteria count was 349, the highest count in this series of samples. When, however, the passenger load was fifty-five the bacterial count was in one sample 186, the lowest figure associated with any passenger load.

From all experimental work, several complex formulas have been devised permitting computations under varying circumstances as to intensity of radiation, air velocity, type of air flow, distance from the rays and the like. The mere introduction of ultraviolet units in the conduits of an air conditioning system affords no assurance of extensive bactericidal action. Conversely, full consideration for all factors involved might indicate sets of ultraviolet radiating facilities sufficient to cope with any air velocity and bacterial load. The practicability of such equipment under some circumstances is open to debate. Nothing in the publications of Wells as cited suggests that with an assumed

velocity of 1,000 linear feet per minute a near-sterile air may be obtained. On the other hand, it is to be recognized that suitable intensities and suitable distribution of ultraviolet lamps in connection with air conditioning will effect some reduction in atmospheric bacterial contamination.

DERMATALGIA

To the Editor:—A woman aged 83, usually in good health, three months ago developed intertrigo between her thighs. This healed with slight medication. Six weeks later her feet at night became uncomfortable because of warmth heat. I do not find this discussed in available textbooks. Nothing I have prescribed has been of benefit. She is compelled to sleep with her feet exposed. She is kept awake from two to four hours each night. Her discomfort is distressing. The patient is a college graduate and is not neurotic or unusually sensitive. I have tried many lotions and the like and have consulted with my medical friends. I do not find the condition discussed in medical books available.

M.D., New Jersey.

ANSWER.—From the description it is assumed that there is no change in the appearance of the skin during attacks, thus justifying the diagnosis of dermatalgia, a disturbance of the nerves supplying the skin of the part affected, supposedly the nerves of the vegetative system. The pain varies in different cases, burning as in the case cited, or a sensation of hot or cold water running over the skin, of stabbing, cutting, rubbing of the skin, or the sensation of an electric current. The attacks come on usually at night, affect middle aged women most often and are commonly associated with hyperesthesia so that the contact of clothing or other objects adds to the distress. Hair parts or the extremities are most often involved.

This disease was discussed in answer to a query on page 739 of THE JOURNAL, Aug. 31, 1935. As possible etiologic factors tabes dorsalis, malaria, rheumatism, diabetes mellitus, leukemia and other members of the lymphoblastoma group and leprosy were mentioned. In addition chlorosis, hysteria and any cause of neuritis are mentioned in the literature. Exposure to cold is also mentioned, probably the reason for the mention of rheumatism. It might be well to examine for anemia and the possibility of certain forms of avitaminosis, especially those in which elements of the vitamin B complex are concerned.

If any such cause can be discovered, treatment directed accordingly may succeed in eradicating the pain. If not and in the considerable proportion of the cases in which no such basis can be found, acetylsalicylic acid, salicin, quinine and arsenic are recommended and the local use of alternating hot and cold applications, galvanic or faradic electricity, or counterirritation over the nerves supplying the part. Langeron and Desplats are quoted as having suggested roentgen therapy over the sympathetic centers for the relief of the pain of dermatalgia. The reference given in the article on dermalgie in the *Nouvelle pratique dermatologique*, volume 5, page 759, is incorrect and the article of Langeron and Desplats has not been traced. A small dose of roentgen rays, from 40 to 80 roentgens filtered through 2 mm. of aluminum, may be effective. This can be repeated at weekly intervals.

As advised in the query of 1935, the skin should be protected as well as possible from the irritation of clothing.

LEAD IN INSULATING MATERIAL

To the Editor:—Have you any information concerning the possibility of lead poisoning to the occupants of a house which is insulated by a material made by the Eagle Picher Company. This material is made from lead slag as a base and is a by-product of the refinement of lead ore. There might be slight sifting through plaster cracks and if the material is not entirely inert there might be an appreciable danger.

George B. Stericker, M.D., Springfield, Ill.

ANSWER.—The chemical composition of Eagle Mineral Wool Home Insulation has been supplied by the firm as follows:

Iron silicate	54.82%
Aluminum silicate	7.40
Calcium silicate	24.23
Magnesium silicate	3.39
Lead silicate .....	.61
Manganese silicate .....	.57
Zinc oxide	9.46
	100.48%

While the constituents listed total more than 100 per cent, the excess may be charged to experimental error. It should be noted that most of the constituents in this mineral wool are in the form of silicates and the trace of lead silicate present is highly insoluble and is regularly used as a constituent of high grade tableware. The possibility of lead poisoning from this

source is rather remote because of the small proportion of lead in the material and the small amount of insulation which might seep through cracks in the plaster. Although this situation does illustrate another potential lead exposure of the general population, the insulation in question with its present chemical constituents has been manufactured and sold in large quantities for more than ten years without knowledge on the part of the manufacturers of a single case (including those handling the installation contracts) of any form of illness or disease resulting from the material.

CHRONIC SAPHENOUS PHLEBITIS AND POSSIBLE EMBOLISM

To the Editor:—On March 7, 1940, a married woman aged 46 developed a sudden pain in the right chest. I examined her chest and found no gross abnormality and made a diagnosis of acute pleurisy. Four hours later I reexamined the patient and discovered an area of consolidation involving the right middle lobe. A variety of râles were present. She coughed and expectorated some bloody sputum. The pulse rate was 130 and the temperature was 100 F. I made a provisional diagnosis of pneumonia. At the hospital the white count was 14,000. A few of the higher type pneumococci were found in the sputum. X-ray examination revealed irregular consolidation of the entire right lung suggesting pneumonia. This cleared in about ten days both clinically and roentgenologically with no specific medication. The temperature ranged between 100 and 101 F. for a week. Nine months previously she had cardiac arrhythmia and she complained about dyspnea. This led a colleague and me to think about the possibility of a pulmonary embolus. She was given only digitalis and morphine. About one week after the onset of the illness phlebitis of the first saphenous vein above the thigh was noted. It was then thought that an embolus developed from this site, although the patient did not complain until later. One consultant felt that the phlebitis was secondary to a pneumonia. On March 20 the patient was discharged apparently well. The pulse rate was 90. There was no fever, and pain in the leg was slight. On March 27, after an attack of coryza, there was a recurrence of the phlebitis. The temperature varied between 99 and 100 F. The average is 99.6 F., in the afternoon and has continued so for nearly four months. The first saphenous vein is painful and tender and feels beaded on palpation. The pulse rate remains at 90. The chest appears clear and there are no chest symptoms. The leg is not swollen and has never been swollen. The patient has been in bed since the onset of her illness. A patch tuberculin test was negative. This was done because of a positive history of tuberculosis in the family. Sputum tests were negative for acid fast organisms. Urinalysis and blood chemistry were normal. The blood Wassermann reaction was negative. X-ray examination of the chest was not repeated because I have feared to have her get out of bed because of the possibility of embolism. My patient has become quite discouraged because there has been no improvement with prolonged rest. I told her that she would be permitted to get up after the temperature remained normal for a time. I hesitate to allow her out of bed because of the possibility of embolism and the possibility of aggravating the inflammation. Treatment has been conservative. Moist and dry heat have been applied locally to the veins. Is this an unusual duration of fever with phlebitis? How long can I expect this fever to continue? What can be done to shorten the course of the inflammation? Would I be justified in using foreign protein therapy?

Joseph F. Lechman, M.D., Latrobe, Pa.

ANSWER:—The description of the initial attack may well fit the picture of pulmonary embolism but the origin of the embolus is obscure. One would have to know whether a pelvic phlebitis is present, which often accompanies infections of the female genitals. A previous history of pain and swelling following childbirth or operation might give a hint as to the existence of a latent pelvic thrombosis. The existence of varicosities is not mentioned in the query. The fact that a saphenous phlebitis followed instead of having preceded the suspected infarct is not unusual, as short clots in the external or internal iliac veins often show a retrograde extension into the veins of the lower extremities after the appearance of the infarct.

Phlebitis following pneumonia is, of course, an equally good possibility; however, it usually appears in a form of an ilio-femoral phlebitis causing swelling, discoloration and visible distention of the superficial veins.

The following methods of treatment are worthy of consideration: (1) eradication of all foci of infection, especially in the teeth and tonsils, (2) small doses of roentgen rays (100 roentgens with heavy filter) at weekly intervals, (3) small doses (from 2 to 2.6 Gm.) of sulfanilamide for from ten days to two weeks. The virulence of the process can be gaged best by the sedimentation rate. If this is a true saphenous phlebitis without involvement of the deep veins there is no need to keep the patient immobilized; the saphenous vein can be tied at its junction with the femoral, thus excluding a possible source of emboli. The division of the vein often hastens the subsidence of phlebitis. If the coagulation time is too short, heparin or leeches are often helpful. The decision as to when to let the patient get up and which of the methods mentioned should be employed requires considerable clinical experience. Recurrent phlebitis and embolism may occur as late as eight years after the initial attack.

A PATENTED ORAL TREATMENT FOR HAY FEVER

To the Editor:—I have heard something about a pollen mixture in yeast of bread making for treatment of hay fever. It was stated that such a patent was given to a Kurt Rosenwald of New York. Could you give me any information on this method?

Leslie S. Harrison, M.D., Bayside, N. Y.

ANSWER:—U. S. Patent 2,207,415, issued July 9, 1940, to Kurt Rosenwald of New York, is described as "the peroral treatment of hay fever in a therapeutical preparation, in which the principal effecting ingredient is a decomposition product of the protein of the pollen of at least one hay-fever-causing plant to which the patient is sensitive, said decomposition product being formed by the action of yeast on said pollen." Apparently this claim of therapy in hay fever is based on the supposition that a digestion product of the pollen taken by mouth will produce some form of immunization. The inventor adds yeast and pollen to a food or drink, such as bread dough, grape juice or beer. In some respects this treatment resembles that proposed a number of years ago by Urbach, in which propeptones of pollen were administered. Since oral pollen therapy has been found to have little if any effectiveness, since Urbach's propeptones have been virtually discarded, at least in this country, and since the proteolytic action of yeast cannot be expected to be more effective than the proteolytic action of the gastrointestinal enzymes, it is difficult to understand how such therapy can be expected to operate.

FATTY DEGENERATION AND INFILTRATION OF HEART

To the Editor:—In Modern Concepts of Cardiovascular Disease (published by the American Heart Association), in volume 7, No. 9 (Sept.) 1938, appears the following statement: "When excess deposits of fat occur in the subpericardial space, penetration or infiltration of fat into the connective tissues lying between the muscle bundles occurs, and at times the penetration occurs between the individual muscle fibers but not into the muscle cell." In an article by E. Perry McCullagh of Cleveland (Management of Obesity, *Ohio State M. J.* 3-4: 1131 [Oct.] 1938), under Clinical Manifestations, the following statement appears: "The heart may be embarrassed for several reasons. It is encroached upon by fat either about the heart, between the muscle fibers, or in the cells themselves." Which view is correct?

Richard P. Shapiro, M.D., Philadelphia.

ANSWER:—Fatty infiltration between the heart muscle bundles is a common observation, especially in the obese, as in middle aged and elderly women, particularly involving the right ventricle; but fat in the muscle cells themselves occurs only in strictly disease conditions in which there is degeneration of the cells, as in the first stages of infarction or other serious involvement of the myocardium per se. Of course it is possible to have both fatty infiltration and fatty degeneration in the same patient, but either may occur alone.

SENSITIVITY TO LIVER PREPARATIONS

To the Editor:—A woman aged 38 suffering from primary anemia has been under treatment for ten years, recently taking an oral preparation which has maintained her blood picture essentially normal, other than for minor poikilocytosis, and has kept her entirely free from symptoms. The cost of this preparation, however, is considerable—about \$15 every six weeks—and this works a definite hardship on her. She has tried raw liver and numerous other preparations containing liver, but nausea prevents therapy other than in capsule form orally. There is a history of the use of parenteral liver therapy about eight years ago, but reactions were so severe that she had to give up this form of therapy. I have recently started treatment with a concentrated liver solution containing 10 U. S. P. units per cubic centimeter. Three injections at weekly intervals caused no untoward response, but the fourth brought forth a typical allergic phenomenon with urticaria and circumscribed and circumbulbar flushing and edema. This reaction lasted about twenty-four hours and then subsided. The next parenteral injection is due next week, and I intend changing to a more refined preparation of 15 U. S. P. units per cubic centimeter. If the reaction still occurs, which is the better course of procedure—to change back to oral liver, which I am reluctant to do, to administer liver therapy with ephedrine sulfate and a barbituric acid derivative parenterally or to try desensitization. If the latter, how may it be carried out and, if once desensitized, will sensitivity redevelop in the intervals between weekly injections?

M.D., Massachusetts.

ANSWER:—Allergy to liver extract in a patient with pernicious anemia is a distressing and sometimes serious situation. Parenteral extract of several different manufacturers might be tried first. It is usually possible to find a preparation to which the patient is not sensitive. It is well to use the most concentrated extracts available, with the hope that the antigenic substance has been eliminated by refining. Trying to give a liver extract to which the patient is known to be sensitive and then attempting to control the reaction with drugs is not advised. Desensitization is not often successful. If a preparation cannot be found to which the patient is not allergic, oral therapy should be continued.

MORPHINE AND PARALDEHYDE

To the Editor:—Have you any information on synergistic toxicity in the use of paraldehyde and morphine? A recent article in a trade publication mentioned that the use of these drugs together may produce serious results.
M.D., Virginia.

ANSWER:—A search of the literature has failed to show any work which would confirm the statement that paraldehyde and morphine when used simultaneously have a synergistic toxicity. One of the widely used methods of controlling eclampsia consists in the intravenous administration of paraldehyde and at the same time the hypodermic use of from one-fourth to one-half grain (0.016 to 0.032 Gm.) of morphine sulfate.

Paraldehyde in therapeutic doses does not depress the heart or respiration. In many cases it seems to exert a stimulating action.

POSSIBLE SENSITIZATION TO DIGITALIS

To the Editor:—Can the human body occasionally become sensitized to digitalis? In August 1939 I gave an excess of digitalis to a 64 year old woman with the usual after-symptoms of overdosage. Later, with the advice of a good cardiologist, I gave one-third tablet of gitalin daily for months. In April of this year I gave her 9 grains (0.6 Gm.) of standard digitalis within twenty-four hours, thinking I saw indications. She had an extreme gastric upset which lasted to some degree for ten days. I then stopped all medication and continued bed rest for thirty days and started the gitalin, one-third tablet daily. The second third of a tablet was followed by gastric pain occurring six or eight hours after and lasting two or three hours with definite fall of pulse rate (from 85 to 55 and 60) and gastric upset. I am inclined to feel that she was suffering from the two small doses and is therefore sensitized to digitalis and its preparations.
J. D. Michie, M.D., Childress, Texas.

ANSWER:—While it is unwise to say that certain things never happen in the field of medicine, especially in allergy, a careful perusal of the literature shows no reference to allergic intolerance of digitalis. The following works, limited to digitalis, fail to mention this as a possibility: Heftner, A.: *Handbuch der experimentellen Pharmakologie*, Berlin, Julius Springer, 1935, vol. 1; Weese, H.: *Digitalis*, Leipzig, Georg Thieme, 1936. Nor does a general manual of pharmacology, like that by Solfmann (fifth edition, 1936), mention this as a possibility. It seems probable from the history given that the reaction described is not allergic.

PROSTIGMINE COMPOUNDS AND GLAUCOMA

To the Editor:—A patient is being treated for moderate glaucoma with drops of pilocarpine solution. She has some ear trouble (blocking of eustachian tubes) and the otologist prescribed prostigmine bromide 15 mg. three times a day and prostigmine methylsulfate (1:2,000) by injection twice weekly. Will this treatment be detrimental or have any effect on the eye? The otologist does not want to give an opinion. Will this treatment have any effect on the eye muscles as in myasthenia gravis?
B. O. LeBlanc, M.D., St. Gabriel, La.

ANSWER:—The preparations of prostigmine mentioned would not have any detrimental effect on the eye. It is even possible that they might have a beneficial effect in the case of glaucoma, although this is certainly doubtful. Prostigmine compounds are, of course, closely related to those of physostigmine and are used in the form of drops as a substitute in some cases of glaucoma.

DISCHARGING BREAST

To the Editor:—A woman aged 46 has one breast that has been discharging a thin yellowish to a fairly thick yellowish serous fluid for the past ten or eleven years, since her last child was born. One year ago this breast discharged a light bloody fluid for about two weeks, then a dark bloody fluid for two weeks and thereafter the serous fluid again. Recently the bloody discharge has begun again. There are no masses, no induration, no shadows on transillumination, no pain and no tenderness. Estrogen has been given without any noticeable result. I am especially interested to know whether there would be any value in administering 1:4,000 prostigmine methylsulfate solution in an attempt to clear up the discharge from a breast which gives absolutely no shadow of any kind on careful transillumination.
M.D., Texas.

ANSWER:—In view of the long-standing history and the completely negative physical examination, one is inclined to assume that at present a malignant condition is not apparent, although it might be microscopic. It is difficult to understand how prostigmine methylsulfate solution could inhibit the discharge. Possibly testosterone propionate might be of benefit, at least temporarily, by causing involution of the breasts. Twenty-five mg. of testosterone propionate, in such instances, is injected subcutaneously three times a week for a period of from four to six weeks. The danger of producing virilism, such as hirsutism, change in voice and enlargement of the clitoris, cannot be overlooked. However, the suggested dose is not large and the risk is probably slight. Furthermore, signs of virilism practically

always disappear when the drug is discontinued. The discharge may stop spontaneously when the ovaries cease to function. If testosterone propionate does not inhibit the discharge, radiation therapy to the ovaries may be considered. There is not likely to be harm in this procedure because the patient is 46 years old.

ONYCHOGRYPHOSIS

To the Editor:—A man aged 44 has onychogryphosis. He is a produce merchant in a vegetable market. The nails affected are those of the two index fingers and the condition seems to be directly attributable to the constant lifting of cases of iceberg lettuce by the use of both index fingers. It has had a gradual onset for six weeks. For three weeks I pared the thickened nails down to the matrix, applied a 3 per cent salicylic acid ointment, used warm soaks, and now am trying to restore the nutrition of the nail and fingers with diathermy. The literature gives a paucity of information concerning its cure. I have been unable to cure his condition. Could you please give me the latest opinions as to etiology and effective therapy in onychogryphosis.

Vincent J. Barone, M.D., Elmhurst, Queens, N. Y.

ANSWER:—In onychogryphosis the nail becomes enormously thickened and clawlike. Pressure, warmth and lack of proper care are contributing causes. Thickened and enlarged nails are at times observed in leprosy, tuberculosis, acromegaly and syringomyelia. The hypertrophic changes may often be found in association with local irritation or injury and with gout, rheumatism and certain diseases, e. g. eczema, paronychia, psoriasis and occupational dermatitis.

It is suggested that trauma be avoided as far as possible; the patient might consider wearing canvas gloves at his work, and careful cleanliness and regular manicure of nails should be insisted on.

An unusual case of onychogryphosis on the basis of a combination of rheumatism and lack of care in a patient aged 73 was reported by Wien and Perlstein (*Arch. Dermat. & Syph.* 28:807 [Dec.] 1933).

POSSIBLE HOMOSEXUAL TENDENCIES

To the Editor:—A man whose standing, personally and professionally, has always been beyond reproach or question has been accused of improper sex relations with other men, these men stating that he approached them not by question but by touch. It has been established that the men in question are of somewhat doubtful character and one of them, at least, has reason to wish this man harm. The man's personal life is far above the average; he has a wife and children and is splendidly educated. I cannot find it possible to believe such accusations. He has denied them and was shocked beyond belief at having them made. He is perfectly willing to undergo any examination, physical or psychologic, which would assist in proving him innocent or incapable of such conduct. The problem presented is: What examinations? I have never before been confronted with such a matter, have no literature dealing with it and am at a total loss as to procedure. This matter is vitally important to this man's career.
M.D., Florida.

ANSWER:—The patient should be given a complete medical and psychiatric examination. Any standard textbook of psychiatry outlines the routine psychiatric form to be followed. The following textbooks are suggested:

Henderson, D. K., and Gillespie, R. D.: *A Textbook of Psychiatry*, ed. 4, New York, Oxford University Press, 1938.
Singer, H. D., and Krohn, W. O.: *Insanity and Law*, Philadelphia, P. Blakiston's Sons & Co., 1924.

The problem in this case may be one of homosexual tendencies in an otherwise normal person. It is well known that such homosexual tendencies are merely arrests in psychologic development and that such people may marry and have a perfectly happy family life but may continue to exhibit homosexual interests. They require prolonged psychotherapeutic help and should be under the direct care of a psychiatrist. Many of them can be helped, but, more important, they must be protected from hostile and often trouble-making persons in their environment.

CHRONIC NODULAR PHLEBITIS

To the Editor:—A patient has a series of small nodules within the walls of the brachial vein and its branches in the forearm. They are accompanied by numbness in the forearm. The patient is a man aged 32 and has always been well. The Wassermann reaction is negative. What might these small hard nodules be?
C. W. Henney, M.D., Portage, Wis.

ANSWER:—The syndrome of chronic nodular phlebitis has been described by Gougerot. It may be due to low grade pyogenic, tuberculous, syphilitic or mycotic infection. The nodules may form sharp edged, poorly granulating ulcers with a yellowish base. There is no fever or glandular involvement. When seen early the granuloma is under the intima and may resemble a rheumatic nodule. In this particular case, because of the associated numbness, one should think of the possibility of a neurofibromatosis of Recklinghausen originating from the sheaths of peripheral nerves.

Medical Examinations and Licensure

COMING EXAMINATIONS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, September 21, page 1043.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 17-19. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ARIZONA: * *Written*. Phoenix, Oct. 1. *Reciprocity*. Phoenix, Oct. 2. Sec., Dr. J. H. Patterson, 326 Security Bldg., Phoenix.

ARKANSAS: * *Regular*. Little Rock, Nov. 7-8. Sec., Dr. D. L. Owens, Harrison, *Eclectic*. Little Rock, Nov. 7. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), San Francisco, Oct. 2. *Written examination*. Sacramento, Oct. 21-24. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

CONNECTICUT: * *Written*. Hartford, Nov. 12-13. *Endorsement*. Hartford, Nov. 26. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. *Homoeopathic*. Derby, Nov. 12-13. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: July 8-10. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniels, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: * *Washington*, Nov. 11-12. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: * *Tampa*, Nov. 18-19. Sec., Dr. W. M. Rowlett, Box 786, Tampa.

GEORGIA: Atlanta, Oct. 8-9. Joint-Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.

HAWAII: Honolulu, Jan. 8-11. Sec., Dr. James A. Morgan, 48 Young Building, Honolulu.

IDAHO: Boise, Oct. 1. Dir., Bureau of Occupational License, Mr. H. B. Whittlesey, 355 State Capitol Bldg., Boise.

ILLINOIS: Chicago, Oct. 1-3. Superintendent of Registration, Mr. Lucien A. File, Springfield.

INDIANA: Indianapolis, June 17-19. Sec., Board of Medical Registration and Examination, Dr. J. W. Bowers, Citizens Trust Bldg., Fort Wayne.

KANSAS: Topeka, Dec. 10-11. Sec., Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, Dec. 3-5. Sec., State Board of Health, Dr. A. T. McCormack, 620 Third St., Louisville.

MAINE: Portland, Nov. 12-13. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Regular*. Baltimore, Dec. 10-13. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homoeopathic*. Baltimore, Dec. 10-11. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 12-14. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MICHIGAN: * *Lansing*, Oct. 9-11. Sec., Dr. J. Earl McIntyre, 202-4 Hollister Bldg., Lansing.

MINNESOTA: * *Minneapolis*, Oct. 15-17. Sec., Dr. Julian F. Du Bois, 350 St. Peter St., St. Paul.

MISSISSIPPI: *Reciprocity*. Jackson, December. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MISSOURI: Kansas City, Oct. 29-31. Sec., State Board of Health, Dr. Harry F. Parker, State Capitol Bldg., Jefferson City.

MONTANA: *Reciprocity*. Helena, Sept. 30. *Written*. Helena, Oct. 1-2. Sec., Dr. S. A. Cooney, 216 Power Block, Helena.

NEVADA: *Reciprocity with oral examination*, Nov. 4. Sec., Dr. Fred M. Anderson, 215 N. Carson St., Carson City.

NEW HAMPSHIRE: Concord, March 13-14. Sec., Board of Registration in Medicine, Dr. T. P. Burroughs, State House, Concord.

NEW JERSEY: Trenton, Oct. 15-16. Sec., Dr. Earl S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO: Santa Fe, Oct. 7-8. Sec., Dr. Le Grand Ward, 135 Sena Plaza, Santa Fe.

NORTH CAROLINA: *Reciprocity*. Durham, Dec. 3. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, Jan. 7-10. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OKLAHOMA: * *Oklahoma City*, Dec. 11. Sec., Dr. James D. Osborn Jr., Frederick.

OREGON: * *Reciprocity*. Portland, October. *Written*. Portland, Jan. 14-16. Exec. Sec., Miss Lorraine M. Conlee, 608 Failing Bldg., Portland.

PENNSYLVANIA: Philadelphia, January. Acting Sec., Bureau of Professional Licensing, Miss Marguerite G. Steiner, 358 Education Bldg., Harrisburg.

RHODE ISLAND: * *Providence*, Oct. 3-4. Sec., Division of Examiners, Dr. Robert M. Lord, 366 State Office Bldg., Providence.

SOUTH CAROLINA: Columbia, Nov. 12. Sec., Dr. A. Earle Boozer, 505 Saluda Ave., Columbia.

SOUTH DAKOTA: * *Pierre*, Jan. 21-22. Dir., Medical Licensure, Dr. J. F. D. Cook, Pierre.

TEXAS: Austin, Nov. 25-27. Sec., Dr. T. J. Crowe, 918-920 Mercantile Bldg., Dallas.

VERMONT: Burlington, Feb. 11. Sec., Dr. W. Scott Nay, Underhill.

VIRGINIA: Richmond, Dec. 4-6. Sec., Dr. J. W. Preston, 30½ Franklin Rd., Roanoke.

WEST VIRGINIA: Morgantown, Oct. 31-Nov. 2. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WISCONSIN: * *Madison*, Jan. 14-17. Sec., Dr. H. W. Shutter, 425 E. Wisconsin Ave., Milwaukee.

WYOMING: Cheyenne, October. Sec., Dr. M. C. Keith, Capitol Building, Cheyenne.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

CONNECTICUT: New Haven, Oct. 12. Address State Board of Healing Arts, 1945 Yale Station, New Haven.

DISTRICT OF COLUMBIA: Washington, Oct. 21-22. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: Gainesville, Nov. 1. *Applications must be on file not later than Oct. 16*. Sec., Prof. J. F. Conn, John B. Stetson University, DeLand.

IOWA: Des Moines, Oct. 8. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

MINNESOTA: Minneapolis, Oct. 1-2. Sec., Dr. J. Charnley McKinley, 126 Millard Hall, University of Minnesota, Minneapolis.

NEBRASKA: Lincoln, Oct. 1-2. Dir., Bureau of Examining Boards, Mrs. Clark Perkins, 1009 State Capitol Bldg., Lincoln.

OKLAHOMA: Oklahoma City, Nov. 18. Sec., Dr. James D. Osborn Jr., Frederick.

OREGON: Portland, Oct. 26. Sec., Mr. Charles D. Bryne, State Board of Higher Education, University of Oregon, Eugene.

RHODE ISLAND: Providence, Nov. 20. Acting Chief, Division of Examiners, Mr. E. Clyde Thomas, 366 State Office Bldg., Providence.

SOUTH DAKOTA: *Examination*. Yankton, Dec. 6-7. *Endorsement*. Dec. 21. Sec., Dr. Gregg M. Evans, Yankton.

Nebraska June Report

Mrs. Clark Perkins, director, Bureau of Examining Boards, reports the written examination for medical licensure held at Omaha, June 12-14, 1940. The examination covered ten subjects and included 100 questions. An average of 75 per cent was required to pass. Eighty-two candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Rush Medical College	(1938)	1
Creighton Univ. School of Med.	(1938), (1939, 6), (1940, 7)	14
University of Nebraska College of Medicine (1939), (1940, 66)		67

Nine physicians were licensed to practice medicine by reciprocity and one physician so licensed by endorsement from February 8 through July 27. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Colorado School of Medicine	(1938)	Utah
The School of Medicine of the Division of Biological Sciences	(1935)	Illinois
University of Illinois College of Medicine	(1924)	Illinois
State University of Iowa College of Medicine	(1935)	Iowa
University of Michigan Medical School	(1934), (1935)	Michigan
University of Oregon Medical School	(1938)	Louisiana
Baylor University College of Medicine	(1939)	Texas
University of Western Ontario Medical School	(1936)	Michigan

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Harvard Medical School	(1933)	N. B. M. Ex.

Kansas June Report

Dr. J. F. Hassig, secretary, Kansas State Board of Medical Registration and Examination, reports the written examination for medical licensure held at Kansas City, June 18-19, 1940. The examination covered ten subjects and included 100 questions. An average of 75 per cent was required to pass. Eighty candidates were examined, all of whom passed. Thirteen physicians were licensed to practice medicine by reciprocity. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
College of Medical Evangelists	(1940)	86
Loyola University School of Medicine	(1940)	82.9
Northwestern University Medical School	(1940)	86.5
Rush Medical College	(1939)	86
University of Kansas School of Medicine	(1940)	79.4
82, 83.7, 84.1, 84.1, 84.3, 84.7, 84.8, 85, 85.3, 85.3, 85.4, 85.6, 86.1, 86.2, 86.5, 86.6, 86.8, 87, 87.2, 87.3, 87.3, 87.4, 87.6, 87.6, 87.7, 88, 88.1, 88.3, 88.3, 88.5, 88.5, 88.5, 88.6, 88.7, 88.7, 88.7, 88.7, 88.8, 88.8, 88.9, 89, 89.1, 89.4, 89.5, 89.5, 89.5, 89.6, 89.8, 89.8, 90.1, 90.2, 90.5, 90.6, 90.6, 90.7, 90.7, 90.9, 91.5, 91.7, 91.9, 92, 92.4, 92.4, 92.6, 92.8, 93.5		
Harvard Medical School	(1938)	86.9
Creighton University School of Medicine	(1939)	85.9
(1940) 81.9, 83.2, 85.3, 86.4		
University of Pennsylvania School of Medicine	(1938)	93.8

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Southern California School of Medicine	(1939)	California
Howard University College of Medicine	(1926)	Missouri
Loyola University School of Medicine	(1926)	Illinois
Northwestern University Medical School	(1928)	Maryland
State University of Iowa College of Medicine	(1936)	Iowa
University of Michigan Medical School	(1927)	Michigan
Medico-Chirurgical College of Kansas City	(1900)	Missouri
Creighton University School of Medicine	(1935)	New Jersey
Columbia Univ. College of Physicians and Surgeons	(1926)	S. Carolina
Vanderbilt University School of Medicine	(1936)	Mississippi
University of Texas School of Medicine	(1936)	Texas
University of Wisconsin Medical School	(1932)	N. Dakota
McGill University Faculty of Medicine	(1922)	Penna.

Book Notices

Medical Diseases of War. By Sir Arthur Hurst, M.A., D.M., F.R.C.P., Consulting Physician to Guy's Hospital, London, with the co-operation of H. W. Barber, M.A., M.B., F.R.C.P., Physician-in-Charge of the Skin Department, Guy's Hospital, F. A. Knott, M.D., M.R.C.P., Bacteriologist to Guy's Hospital, and T. A. Ross, M.D., F.R.C.P. Cloth. Price, \$5.50. Pp. 327, with 38 illustrations. Baltimore: William Wood & Company, 1940.

This small volume contains much valuable and practical information. The author lays the greatest stress on functional disorders; of twenty-five chapters fifteen are devoted to functional diseases, eleven to hysteria alone. The importance of the subject may be gathered from the fact that, of 341,025 discharges from the British army, neuroses accounted for 6 per cent. The chief predisposing causes of war neuroses appeared to be the neuropathic and psychopathic inheritance and the previous nervous or mental breakdown. Such men are frequently able to lead normal lives as civilians but are totally incapable of adapting themselves to a soldier's life; in fact the author believes that these "martial misfits" should have never been enlisted. The examining boards were too exclusively concerned with the physical fitness of the recruits.

Of the many hysterical symptoms the most common were paralyses and contractures which followed trivial wounds of the limbs. Hurst insists that these could invariably be prevented by persuasion and reeducation as soon as the condition of the wound made active movement permissible. The hysterical nature of these symptoms was proved by rapid cure with psychotherapy. A temporary organic paralysis may be the starting point of the hysterical paralysis. Hysterical paraplegia may result from the perpetuation of the feeling of weakness in the legs caused by terror. There is a special chapter by T. A. Ross on psychoneuroses of war. Ross points out that the treatment of the anxiety state consists primarily in finding out what the anxiety is about. These patients with psychoneuroses were frequently full of self reproach for having feared. They feared they had been cowards. They dreaded having to go back. They feared very much that they would be sent back before they were well. Hurst and Ross are apparently in agreement as to the treatment of these symptoms. Hysterical symptoms especially could invariably be cured by simple psychotherapy in the form of explanation, persuasion and reeducation. It is pointed out, however, that a "negative reassurance" to a neurotic person does not have the slightest effect on a symptom, whereas the most elementary psychologic explanation will cause all the symptoms to disappear. There is a theoretical distinction between *malingering* and *neurosis*; namely, the *maligner* is fully conscious of what he is doing and the neurotic person is not. The term "shell shock" was much abused in the last war because it was applied to almost any form of neurosis. Hurst has no objection to its use provided one has in mind a condition which has an organic basis for it consisting of the more or less evanescent changes in the nervous system resulting from the concussion caused by aerial compression. It is, however, important to remember that hysterical or anxiety symptoms are frequently superimposed on this organic basis. There is much truth in the author's statement that if it had been generally understood that shell shock was not a method of getting to England there would have been much less of it.

The chapter on soldier's heart is in essence a condensation of the views of Sir Thomas Lewis as presented in the recent edition of "The Soldier's Heart and the Effort Syndrome." The remainder of the book contains brief but informative chapters on trench fever, typhoid and paratyphoid fever, dysentery, epidemic jaundice, tetanus, war nephritis and gas poisoning. The author believes that active immunization with tetanus toxoid of all soldiers proceeding on active service will probably lead to the total disappearance of tetanus as a complication of wounds and passive immunization with antitetanic serum will no longer be necessary. A special chapter by H. W. Barber is devoted to the extremely important subject of skin diseases, in particular scabies and pediculosis. Because of its preeminently practical and authoritative grasp of the problems of military medicine, this volume cannot be too emphatically recommended as compulsory reading for the medical personnel of the examining boards and of the medical officers in active service.

La maladie de Besnier-Boeck-Schaumann: Ses manifestations cutanées, ganglionnaires, pulmonaires, osseuses, oculaires, glandulaires, viscérales, nasales, nerveuses. Par L. M. Pautrier, professeur de clinique des maladies cutanées et syphilitiques à la Faculté de médecine de Strasbourg. Paper. Price, \$2.05. Pp. 341, with 105 illustrations. Paris: Masson & Cie, 1940.

The monograph by Pautrier of Strasbourg presents an interesting and authoritative discussion of the Besnier-Boeck-Schaumann disease. Part 1 deals with the evolution of the modern concept of this clinical entity. Because of its historical importance, Besnier's case of "lupus pernio" is presented in detail. This is followed by the description of sarcoid or lupoid lesions of Boeck. Pautrier himself was first to recognize uveoparotiditis of Heerfordt as one manifestation of the disease. He was likewise first to demonstrate in France a case in which there was pulmonary and lymph node involvement in the absence of cutaneous lesions. It was, however, left to Jorgen Schaumann of Stockholm to demonstrate the essential identity of these apparently unrelated clinical entities. Pautrier is emphatic in stating that it was chiefly due to the labors of Schaumann that what was once considered a rare dermatosis has become recognized as a systemic disease capable of invading any tissue or organ of the body. Part 2 is devoted to the description of the gross and microscopic lesions of the skin, mucous membranes, bones, muscles, lymphoids and blood organs, the respiratory tract, the glands, viscera, and ocular and nervous lesions. The text is profusely illustrated with excellent reproductions of photographs of the author's cases and with photomicrographs of histologic preparations.

In his discussion of the nature and the etiology of the disease the author, while acknowledging our great indebtedness to Schaumann, takes issue with him on a number of points. It appears that this new clinical entity has been rather unfortunate in acquiring a number of eponyms. Pautrier feels that the term "sarcoid" is particularly inept and certainly meaningless in cases not presenting cutaneous lesions. He admits the propriety of calling it Schaumann's disease, but to drop Besnier-Boeck would in his opinion lead to too much confusion in the literature. It is rather surprising that in his extensive discussion as to priority he does not mention Jonathan Hutchinson, whose description of a classic case of lupus pernio preceded that of Besnier by two decades. He is, however, definitely opposed to Schaumann's designation of the disease as benign lymphogranuloma. Schaumann apparently was much impressed with the regular involvement of the lymph nodes and with marked monocytosis, so that he came to consider the disease as a sort of lymphadenopathy. Pautrier's objections are based on the following arguments: 1. The disease bears little if any resemblance to other lymphogranulomas such as Hodgkin's or to venereal lymphogranuloma. 2. It displays predilection not only for the lymphatic tissue but also for the eye, the parotid gland and the hypophysis. 3. The histologic unit is not characteristic of a granuloma. In his microscopic studies the author was impressed with the fact that the histologic unit was always the same no matter where encountered. The epithelioid cells composing it are in his opinion derived from histiocytes; in other words, from reticulo-endothelial tissue. Therefore the lesion is in his opinion a reticulo-endotheliosis rather than granulomatosis. The ubiquity of the reticulo-endothelial system explains the ubiquity of the lesions of this disease. Pautrier further differs with Schaumann on the subject of etiology of the disease. Schaumann believes that it is essentially bovine tuberculosis. Pautrier objects to the tuberculosis theory on the basis of certain microscopic differences, in particular the absence of caseation, the failure to demonstrate tubercle bacilli in stained sections, cultures or animal inoculations, and negative reactivity to large doses of tuberculin. Kissmeyer's and his own statistics show that two thirds of the cases react negatively to tuberculin. Pautrier calls attention to the fact that even among the positive reactors one sees only local skin reaction but never a focal reaction. Pautrier sees a further objection to the tuberculosis theory in a certain antagonism between the two diseases, the absence of tuberculous antecedents in the history of these patients and the fact that when true tuberculous lesions develop in one of these the formerly negative reaction becomes positive, while the sarcoid lesions disappear as soon as true tuberculous lesions appear.

Salben und Salbengrundlagen: Ein Leitfaden für Ärzte und Apotheker. Von Dr. H. v. Czetsch-Lindenwald, Apotheker, Biolaboratorium Oppau der I. G. Farbenindustrie A. G., Ludwigshafen a. Rh., und Dr. F. Schmidt-La Baume, Priv.-Doz., Chefarzt der Hautabteilung der Städtischen Krankenanstalten Mannheim. Mit einem Beitrag: Die Aufgaben der Arbeitsschutzsalben. Von R. Jäger. Paper. Price, 16.80 marks. Pp. 240, with 36 illustrations. Berlin: Julius Springer, 1939.

The difficulties encountered by the authors in their effort to bring the arts of ointment prescribing and ointment making nearer the status of a science are set forth in the preface. Experiments in the laboratory were checked by trials on patients, and the utmost care was observed to make the tests accurate. The authors maintain that the question of ointment bases and their relation to absorption or diffusion of therapeutic agents presents a problem in which not only dermatologists but all physicians should interest themselves. The book is also intended to help the pharmacist, clarifying the borderland relations of pharmacognosy, pharmacology and the knowledge of colloids with pharmacy. It is offered as a bridge between the physician and the pharmacist, explaining to the latter why the physician under certain circumstances employs one ointment and in other cases needs an entirely different one.

The first chapter, after a historical review of the use of ointments, discusses the general bases of salve manufacture, fats, synthetic fats, paraffin hydrocarbons, saturated and unsaturated fatty acids, emulsions, waxes and alcohols. Next the function of ointment is considered, whether it is intended to promote resolution of the inflammation, penetration of the medicament or protection from outside influences. Ointments as carriers of various drugs, such as salicylic acid, mercury and sulfur, hormones, vitamins, bee or snake venom and many other substances are discussed and the use of local anesthetics, disinfectants and dyes in ointments is considered, with the possibility of chemical reactions taking place in the ointment. Warning is sounded against the use of pyrogallol in ointment for the production of imitation tan, which has been practiced in Germany, and the risk of kidney damage and methemoglobin formation is pointed out. The authors, in their laboratory study of the combinations of chrysarobin with various ointment bases, concluded that fats should give better results than petrolatum. Clinical trial in cases of psoriasis showed, however, that the reverse is true and they present this as an illustration of the fact that the conclusions drawn from laboratory experiments and studies of absorption may be wholly reversed by trial in the clinic. Vitamins in salves receive thorough treatment, not omitting vitamins F and H and chlorophyll, though vitamin K is not mentioned. Ointments containing cod liver oil receive attention in four pages.

The chapter on salves containing hormones is of particular interest in the light of the controversy on this question in this country. Nothing is said of the possibility of harm resulting from such ointments used as cosmetics. A striking example of the enthusiasm of European drug houses is granulomosalbe, made in Hungary, said to contain cod liver oil and extracts of testicle, skin, ovary, hypophysis cerebri and thyroid gland. According to Frenkel and Heks (*Terapia* 7:437, 1930) the field of activity of this wonderful ointment corresponds to its complexity. The discussion ends with the remark that in most cases percutaneous hormone therapy should be used to complement the application of ointments containing hormones. Special attention is given salves for the use of the veterinarian, salves for use in the nose or eye, suppositories, the technic of production of ointments, and their testing, packing and preservation.

A pleasant relief from the serious study of ointment construction and use is the short consideration of ancient types of ointment still in circulation, such as those used for witchcraft. The authors quote a Swiss journal's description of an ointment to be applied to the axillae and about the genitalia which is guaranteed to produce pleasant dreams. In the analysis traces of alkaloids were found, which explains the recommendation that the salve be applied to parts secreting alkaline sweat. Evidently the producers later became cautious and reduced the amount of active ingredients to protect themselves. The American cosmetic industry comes in for attention. Navaree is quoted on the constituents of an "eyelash food." Yellow petrolatum perfumed with ethereal oils is completed by the addition of turtle oil. The latter is necessary, no doubt, is the comment,

because of its content of valuable hormones, those that are responsible for the great length of the eyelashes of the tortoise.

The book ends with a plea for more attention to salve bases and salve construction in the daily work of the physician and pharmacist, if they are not intent on being outstripped in this matter by the maker of cosmetics. A simple list of five types of ointment bases is given, from which the physician can choose, depending on the effect desired. An excellent summary sets forth briefly the indications for the various salve types. Apologizing for the fact that not all known ointments have been mentioned, the authors explain that their aim has been to describe types and to mention the most important examples of each type, to avoid complexity.

The appendix, a discussion by R. Jäger of the structure and function of salves intended to protect workmen against irritating substances in industry, is a valuable and practical treatise. The author, while not able to offer any short and sure method of protection against all the cutaneous hazards of industry, suggests a scientific and practical method of attacking the problems as they arise.

The book is a mine of useful information for the physician, the pharmacist and the maker of cosmetics.

Manual of Peripheral Vascular Disorders. By David W. Kramer, M.D., F.A.C.P., Assistant Professor of Medicine, Jefferson Medical College, Philadelphia. Cloth. Price, \$6. Pp. 448, with 126 illustrations. Philadelphia: Blakiston Company, 1940.

The general plan of this book is excellent. There are chapters on symptoms, history taking, physical examination, methods of studying circulation, evaluation of various tests of circulatory function, clinical application of circulatory tests, occlusive vascular disorders of various forms, treatment, vasospastic and vasodilator disorders, hypertension, traumatic vasospasm, gangrene and disorders of veins. Lymphedema is not considered.

While many phases of the subjects presented are admittedly controversial, many statements are made which conflict with the views of accepted experts in the field of peripheral circulation. These statements should not detract greatly from the value of the book. The author writes that claudication is "frequently" relieved by rest. It always is. He states that circulation is normal if pulsations in the dorsalis pedis and posterior tibial arteries are normal, yet there have been reports of thromboangiitis obliterans involving digital arteries when pulsations were normal in the dorsalis pedis and posterior tibial arteries. The statement is made that Negroes do not have thromboangiitis obliterans. That is an opinion contrary to at least one excellent report. Contrary to the author's opinion, bruits are frequently absent in congenital arteriovenous fistula. Also decompensation of the heart is relatively rare when acquired arteriovenous fistula is first recognized. The author implies that cardiac decompensation is always present. He does not support his contention that diabetic "arteritis" is a form of inflammatory occlusive arterial disease; he is inconsistent in classifying "chronic arteritis" under noninflammatory occlusive vascular disorders; he gives no reason for designating arteriovenous fistula as a form of occlusive arterial disease (which it isn't); he confuses temporal arteritis with periarteritis nodosa and he fails to give evidence as to why neurotropic disorders, such as syringomyelia, should be considered occlusive vascular disorders. The statement that thromboangiitis obliterans never has an acute onset neglects reports in the medical literature. It is improbable that "endarteritis obliterans," as described by the author, is a clinical or pathologic entity. Few will agree that peripheral endarteritis is caused by syphilis, and the author has proved only that patients with chronic occlusive arterial diseases occasionally have syphilis. Nothing is said of the desirability of using heparin in arterial embolism. Contrary to the author's statement, erythromelalgia is not always bilateral. The quotation of a classification of essential hypertension lacks accuracy. There is so little in the seven pages on hypertension that they might well have been omitted. There is emphasis on the value of the reaction of the skin to intracutaneous injection of histamine, a test which the author has used extensively, but in many clinics this procedure has been found unnecessary.

Some of the presentation lacks clearness and conciseness and in some parts even the experienced physician may become con-

fused. It is apparent that the subject of peripheral vascular diseases has become too complex for mastery by one person.

The monograph has many virtues. That the author has not supported some particular type of treatment to the virtual exclusion of others, as authors of various monographs on this subject have done, is refreshing. Treatment is emphasized. The chapters which consider methods of studying circulation are generally good. The custom of presenting important points in differential diagnosis in tabular form is desirable. The bibliography seems reasonably complete. This is certainly one of the better monographs on peripheral vascular diseases and is a distinct contribution to the rapidly growing literature on this subject.

Pneumonia and Its Nursing Care. By Herbert K. Ensworth, M.D., Instructor in Medicine, Cornell University Medical College, New York, and Lela L. Greenwood, B.A., R.N., Supervisor of Medical Pavilion, Bellevue Hospital, New York. With a foreword by Russell L. Cecil, M.D. Cloth. Price, \$1.50. Pp. 177, with 44 illustrations. Philadelphia, Montreal & London: J. B. Lippincott Company, 1940.

This booklet contains an account of pneumonia and its modern treatment such as every nurse and intelligent layman should possess. The sections devoted to nursing care are amateurish, and considerable supplementary information would be required by a nurse in the field. It is profusely but not well illustrated, many of the halftones having little instructional value in a nurses' manual. The apparatus is poorly chosen; a single stage regulator is shown. The statement "an oxygen cylinder would last six or seven hours" without reference to the liter flow rate is not helpful. The technic of a nurse collecting sputum with the tent opened shows, unless the motor has been stopped, a wasteful loss of oxygen-enriched air. It is preferable to pass the arm under the skirt of the tent. A thermometer and hygrometer should be in every tent, but the authors neither picture nor refer to them. The principles of tent operation are inadequately discussed, and instructions for measuring the oxygen concentration in the tent are not given. The need for protecting the open box oxygen tent from strong currents of air is not mentioned. A disproportionate amount of space and illustration is devoted to the closed puncture drainage operation for empyema. In most cases of pneumococcal pneumonia this type of operation is inapplicable because there is an abundant pleural deposit of fibrin. The section on diet might have been advantageously expanded. The great importance of adequate salt intake is insufficiently stressed. The advances in practice which will probably come in this rapidly changing field may require another edition, at which time deficiencies, especially in the nursing sections, may be corrected.

Electrocardiography. By Chauncey C. Maher, B.S., M.D., Assistant Professor of Medicine, Northwestern University and the Montgomery Ward Medical Clinics, Chicago, and Paul H. Wosika, M.D., M.S., Instructor in Medicine, Northwestern University and the Montgomery Ward Medical Clinics. Third edition. Cloth. Price, \$4. Pp. 334, with 147 illustrations. Baltimore: William Wood & Company, 1940.

The purpose of this book is to furnish physicians and students not fully trained in cardiology with an introduction to the electrocardiographic method. In presenting the third edition the authors have included consideration of the fourth lead, have utilized the standard nomenclature advocated by the American Heart Association and have correlated their terminology with the usage of everyday practice. Delineation of the basic principles underlying electrocardiography and a concise statement of the clinical aspects of the arrhythmias precede the electrocardiographic portrayal of the various disorders of the heart beat. Succeeding chapters include descriptions of ventricular conduction defects, the changes caused by coronary arterial disease, the effects of drugs, and a summary of the electrocardiographic abnormalities associated with different clinical syndromes. The volume is profusely illustrated by well selected electrocardiograms. Forty-two figures diagrammatically illustrate the physiologic and pathologic aspects of the subject and include additional electrocardiographic examples. Throughout the text the close interrelationship between the clinical aspects of heart disease and the electrocardiographic results is stressed. The authors are to be commended for their repeated caution that "the electrocardiogram is only a part of cardiac diagnostic examination. The history, the objective physical findings, the x-ray, fluoroscopy and laboratory tests all contribute positive or negative information. . . . Overemphasis of the diagnostic

significance of minor defects of the QRS and T waves in an electrocardiogram with other findings normal may lead to unwarranted invalidism. . . . The interpretation of this technical data into clinical evidence is a matter of judicious consideration." The volume is essentially a practical manual for clinicians and as such can be warmly recommended to those who wish to orient themselves in this field.

Diseases of the Digestive System and Food Allergy. By Josef S. Smul, M.D., Assoc. Gastro-Ent., Beth David Hospital, New York. Cloth. Price, \$3.50. Pp. 219. New York: Medical Library Company, 1940.

This curious book was written by a man who seems to have the idea that most diseases of the digestive tract, including cancer of the stomach and amebic dysentery, should be treated with a diet consisting of what he calls anallergic foods. Most curiously he includes among these anallergic foods such items as milk, eggs, wheat, cocoa, tomatoes and melons, which, according to all allergists, are looked on as the worst of offenders. The author believes that what he calls alimentallergy can now replace more than fifty clinical syndromes previously recognized under other names. As one would expect, he furnishes no adequate proof for his astounding doctrines. We suspect the book will be of interest only to collectors of medical curios.

The Diagnosis and Treatment of Diseases of the Peripheral Arteries. By Saul S. Samuels, A.M., M.D., Chief of the Clinic for Peripheral Arterial Diseases, Fourth Division, Bellevue Hospital, New York. Second edition. Cloth. Price, \$6.50. Pp. 372, with 106 illustrations. New York, Toronto & London: Oxford University Press, 1940.

In the present edition this monograph has been greatly enlarged. New chapters have been added on acrocyanosis, periarteritis nodosa, embolism, cervical rib and scalenus syndrome, axillary vein thrombosis, frost bite, glomus tumor and aneurysm of the peripheral vessels. The number of illustrations has been increased. Thus the book has really become a much more rounded out discussion of peripheral circulatory disturbances; because of their frequency, thrombo-angiitis obliterans and arteriosclerosis obliterans have received most of the space. The clear lucid style of the author makes for pleasant and instructive reading. His experience in this field is obvious. The diagnostic methods are simple and his logic of treatment is sound and safe. Great emphasis is laid on oscillometric readings and on the value of color changes; little value is ascribed to the venous filling time and to the histamine and salt wheals. In the treatment of peripheral vascular disorders the author does not advocate suction and pressure therapy, intermittent venous hyperemia, typhoid vaccine injections, whirlpool baths and contrast baths. Hot sitz baths, diathermy and hypertonic salt solutions are favored. The vasomotor component in organic vascular disease does not play an important part in the author's opinion. Sympathetic ganglionectomy and crushing of peripheral nerves are not indicated in the organic vascular disorders. Even in Raynaud's disease, sympathectomy occupies a small place in the author's methods of treatment. This monograph is an excellent account of the author's methods of diagnosis and therapy. As such it is interesting and instructive reading for those who are especially interested in this field. While the subject material has been greatly extended compared with the first edition, it still lacks a wider concept of peripheral vascular disease and hardly covers the achievements of other workers. The general practitioner will not find it a review of the latest developments.

La costituzione della donna e la lotta contro i fattori di sterilità. Atti della 1ª settimana medica internazionale di Salsomaggiore (29 agosto - 4 settembre 1937—A. XV). Pubblicati dalle RR. Terme a cura del Prof. V. de Biasi, docente di Clinica ostetrico-ginecologica nella R. Università di Genova. Paper. Price, 65 lire. Pp. 788, with illustrations. Rome: Luigi Pozzi, 1938.

This work is a compilation of articles presented by various European gynecologists at the international medical convention at Salsomaggiore, Italy, in September 1937. It discusses the subject from an etiologic and therapeutic standpoint. These meetings were encouraged by the Fascist government, whose Duce believes "that strong and fertile human beings are more important for a nation than bars of gold in the treasury." A special emphasis is made of the importance in maintaining a balanced psychoneuro-endocrine system to avoid genital insuf-

fiency. Throughout the work emphasis is likewise placed on the therapeutic value of the Salsomaggiore waters in augmenting endocrine treatment. A classification of the various waters, the different modes of applying this treatment and the rationale of their action are stressed. In a discussion of sports on the maternal function, the author concludes that moderate and sensibly practiced sports increase rather than impair woman's fecundity. The articles add little to the subject of sterility. Considerable repetition as well as a noticeable lack of data and illustrations are apparent.

Les jours de l'homme. Par le Docteur Besançon. Paper. Price, 15 francs. Pp. 149. Paris: Vigot Frères, 1939.

In this essay on longevity the author, an octogenarian, discusses the problem from various angles and comes to some startling conclusions. Four factors are responsible for longevity: (1) continuous flow of sex hormones, (2) mental activity, (3) transmitted diseases and (4) heredity. Mental activity, he says, is necessary for rejuvenation of the brain cells. Many priests, physicians, writers and other intellectuals live long, and more men than women reach old age because brain work required by their profession renovates their hormones. As to the third factor, two thirds of the entire medical field is covered by two groups of diseases: (1) diseases of species, chiefly of an infectious origin, and (2) diseases of individuals, mostly of a nervous character, transmitted from the father to his descendants and represented by a long array of such conditions as eczema, asthma, migraine, dyspepsia, nervous diarrhea, hemorrhoids, lithiasis and diabetes. If such functional diseases persist, longevity may be expected because the patient pays in small instalments his debt for the privilege of living long. It follows that such ailments should not be suppressed, because if they are exterminated the patient may share the fate of his disease. The essay ends with a eulogy of physicians. Malgaigne used to give the following advice: "If your son is intelligent, make an internist out of him; if he is stupid let him be an obstetrician, and if he has no brains but has a manual skill, train him in surgery." Most of the authors' conclusions and remarks do not require comment; they resemble an issue of Tonics and Sedatives.

Tomography. By J. B. McDougall, M.D., F.R.C.P., F.R.S.E., Medical Director, Preston Hall, Maldstone, Kent. Cloth. Price, 21s. Pp. 73, with 110 illustrations. London: H. K. Lewis & Co., Ltd., 1940.

The author has attempted to demonstrate the value of tomography in the diagnosis of pulmonary tuberculosis. Those not familiar with the term will appreciate the explanation that tomography is intended to indicate sectional radiography. It has otherwise been described as planigraphy, stratigraphy and laminagraphy. One author has referred to the instrument for making tomograms as an "x-ray focusing machine." In other words, it is a method whereby the parts to be examined may be studied at previously determined depths. The author argues that tomography is superior to the stereoscopic method. Numerous illustrations illuminate the work, which is in atlas form. The author is not very convincing in his attempt to minimize the value of the stereoscopic method in pulmonary tuberculosis. In certain cases tomography seems to have definite superior value.

Diesel Engines Underground. 1: Composition of Exhaust Gas from Engines in Proper Mechanical Condition. By John C. Holtz, L. B. Berger, M. A. Elliott and H. H. Schrenk. United States Department of the Interior, Bureau of Mines. Report of Investigations 3508. Paper. Pp. 48. Pittsburgh, 1940.

The use of internal combustion engines in underground mining operations presents several interesting problems involving safety and health. This study deals with the nature of the exhaust gases from Diesel motors. These gases may be hot enough to ignite inflammable atmospheres in mines and contain definitely toxic constituents. Variations in use result in changes in the nature of the exhaust gases, but even under optimum conditions of speed, power output and fuel-air ratio, sufficient quantities of carbon monoxide, carbon dioxide, the oxides of nitrogen and aldehydes are produced to make ventilation necessary.

Les pneumolyses chirurgicales dans le traitement de la tuberculose pulmonaire. Par Jean Chenebault. Paper. Pp. 473, with 42 illustrations. Paris: Librairie Louis Arnette, 1939.

The title might be freely translated to read *My Experiences with Extrapleural Pneumothorax, a Review of Over 150 Cases.* If this were the title it would tell exactly what the book is about. Chenebault prefers the term pneumolyses to extrapleural pneumothorax and further distinguishes between two types: the parapneumolyses, which correspond to what we call extrapleural pneumothorax, and telepneumolyses, which correspond to the procedure employed in doing an apicolyses according to Semb. The entire subject is discussed: the history, through anatomy, pathologic anatomy and technic. The last part of the book deals with a report of 115 cases of extrapleural pneumothorax, twenty-one cases of extrapleural pneumothorax associated with thoracoplasty and thirty-seven cases of "telepneumolyses" associated with thoracoplasty. The book is written in French. It is well written and readable. The final chapter sums up the author's opinion on the entire subject. There is a good bibliography. The book should be on the shelf of any one making a study of the collapse treatment of tuberculosis.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Fraudulent Concealment as Tolling Running of the Statute of Limitations.—The plaintiff brought suit for malpractice against the three physician defendants in December 1935. He alleged, essentially, that (1) in operating on his wife in 1930 they left two sponges in her abdomen, (2) they allowed her to leave the hospital about fifteen days after the operation while she still had an elevated temperature, without informing her or him of the presence of the sponges and without giving any instruction as to further treatment, and (3) the patient suffered continuously thereafter, necessitating another operation in June 1935, when sponges were discovered in her abdomen and were removed. The plaintiff filed three different amended petitions, the last one in 1938. In the last amended petition he alleged for the first time that the physicians during the operation in 1930 and at all times thereafter knew of the presence of the sponges in the patient's abdomen and fraudulently concealed from him and from the patient their presence and the necessity for removing them. Each physician, in separate answers, took exception to the third amended petition on the ground that it was barred by the applicable two year statute of limitations. They claimed that the plaintiff's cause of action based on malpractice had accrued more than two years before the commencement of the suit and that the cause of action based on the alleged fraud of the defendants had likewise accrued more than two years prior to the first filing of any allegations charging fraud. The court sustained the exceptions and dismissed the suit, and the plaintiff appealed to the court of civil appeals of Texas, Waco.

The plaintiff contended that the action of the trial court was in error, arguing that (1) the two year statute of limitations could not be regarded as running against him until such time as he could reasonably be charged with knowledge that the sponges had been left in his wife's abdominal cavity; (2) the physicians' failure to inform him or his wife of the presence of the sponges in the latter's body tolled the statute of limitations until such time as the presence of the sponges was discovered or should have been discovered, and (3) the charge of fraudulent concealment, contained for the first time in his third amended petition, did not constitute a new and independent cause of action. But, said the court of civil appeals, by the apparent weight of authority a physician's failure to remove a sponge before closing an incision is negligence as a matter of law. Generally the statute of limitations commences to run in such a case as the instant one from the time the duty owing to the plaintiff is breached by the wrongful or negligent act of the defendant, even though the plaintiff is ignorant of the existence of the cause

of action or even though damages are not sustained until after the commission of the tort. But if, as the plaintiff alleged, the defendants in this case knew at the time and continuously after the incision was closed that sponges had been negligently left in the patient's abdomen, and if they discharged her without disclosing the situation and without suggestion or advice as to further treatment, the statute would have been tolled until the fraud was, or could by the exercise of reasonable diligence have been, discovered. Consequently, the trial court should have heard evidence to enable it to determine whether or not there had been a fraudulent concealment, as was alleged by the plaintiff. While the fraudulent concealment of a cause of action by a defendant will prevent the bar of the statute of limitation if the plaintiff in the exercise of ordinary diligence fails to discover the existence of a cause of action, fraudulent concealment of a cause of action is not in itself a cause of action separate and apart from the underlying malpractice. The fraudulent concealment merely estops the guilty party from asserting or relying on the defense of limitations until his fraud is, or by the exercise of ordinary diligence could have been, discovered by the plaintiff. If, continued the court, such a situation existed in the instant case, the plaintiff's cause of action may have appeared to be barred at the time he filed his suit, but it was not in fact barred if the defendant physicians were estopped to rely on the defense of limitation because they had fraudulently concealed the cause of action. Whether it was barred in fact will depend on the testimony which may be presented at a future trial.

For the reasons above stated, the court concluded that the trial court had erred in sustaining the exceptions, and accordingly it reversed the judgment of dismissal and remanded the cause for a new trial.—*Thompson v. Barnard (Texas)*, 142 S. W. (2d) 238.

Malpractice: Liability for Injury to Patient from Nurse's Operation of Fluoroscope.—The plaintiff was referred by her attending physician to the defendant physicians for fluoroscopic examinations. The fluoroscope owned by the defendants was one manufactured by the defendant Black Company. On Jan. 19, 1937, the plaintiff, as she had done preparatory to examination on six prior occasions, stepped up on the foot rest of the fluoroscope and placed her back against the fluoroscopic table which was in a perpendicular position. A nurse employed by one of the defendant physicians, by means of a switch, turned on the electric current which was supposed to cause a system of gears to tilt the table backward so that the plaintiff would lie on it in a horizontal position. While the apparatus was being so operated a pin in the gear system broke because of crystallization and, although the defendant nurse turned the switch in the opposite direction in an attempt to reverse the movement of the apparatus, the table continued to move backward rapidly beyond the horizontal position. The plaintiff was thrown backward off the table, striking her neck and shoulders against the wall and floor. She sustained injuries, to recover damages for which she brought suit against the defendants, the two physicians, the nurse and the manufacturer. From a judgment of the trial court in favor of the defendants, the plaintiff appealed to the district court of appeal, first district, division 2, California.

The plaintiff based her case on the theory that the doctrine of *res ipsa loquitur* was applicable. She contended that, since she had shown that the fluoroscopic apparatus which had caused her injuries was under the management of the defendants and that the accident was one which would not have happened ordinarily if those who managed the use of the apparatus had exercised proper care, an inference arose, in the absence of an explanation by the defendants, that the accident had been caused from their lack of proper care. The district court of appeals, however, was of the opinion that, assuming that the doctrine of *res ipsa loquitur* was applicable, the plaintiff had adduced no evidence which would have supported a verdict in her favor. The court could not agree with her contention that the defendant nurse was incompetent to operate the fluoroscopic apparatus. The nurse's undisputed testimony showed that she was competent and that she had had several years of experience in operating a fluoroscope. With respect to the plaintiff's claim that the nurse had no license to operate a fluoroscope the court pointed out that she had failed to indicate what license a person needs

to operate a fluoroscopic table, a barber chair or any other tilting chair. In operating the switch the nurse committed no act of negligence because, as the evidence disclosed, after the pin broke the table was out of control and its motion was unaffected by any movement of the switch. In the judgment of the court, the plaintiff had failed to prove that the defendants were negligent.

Also, continued the court, assuming that the doctrine of *res ipsa loquitur* was applicable, any possible presumption in favor of the plaintiff was rebutted by evidence introduced by the defendants. They showed that the fluoroscope used had been purchased from a reliable manufacturer only eight years prior to the date of the accident; that the apparatus was of standard make; that many such machines were in use in California and elsewhere and had been used for as long as twenty-five years, and that the fluoroscopic table in question had been used daily and at frequent intervals had been oiled, inspected and repaired. The defendant physicians, said the court, were required to exercise only reasonable care to protect the plaintiff, an invitee, from injury by making ordinary examinations of their equipment. In making a proper examination the defendants were not required, as the plaintiff contended, to go to such lengths as to cause the gear box of the apparatus to be taken off from time to time, the gears removed and the pin taken out of its socket and subjected to the roentgen ray to detect any possible crystallization. Prior to the moment of the accident, the defendants had no notice of any defect in their apparatus because nothing had occurred to indicate that the pin had become weakened or worn. In the judgment of the court, latent defects which are either concealed in defective workmanship or are incidental to ordinary wear and tear of usage are among those casualties which no man can avoid without the exercise of that extraordinary care and vigilance which the law does not impose.

Accordingly, the district court of appeal affirmed the judgment in favor of the defendants.—*Johnston v. Black Co. et al. (Calif.)*, 91 P. (2d) 921.

Society Proceedings

COMING MEETINGS

- American Academy of Ophthalmology and Oto-Laryngology, Cleveland, Oct. 6-10. Dr. William P. Wherry, 107 South 17th St., Omaha, Secretary.
- American Academy of Pediatrics, Memphis, Tenn., Nov. 18-20. Dr. Clifford G. Grulee, 636 Church Street, Evanston, Ill., Secretary.
- American Clinical and Climatological Association, White Sulphur Springs, W. Va., Oct. 28-30. Dr. Francis M. Rackemann, 263 Beacon St., Boston, Secretary.
- American College of Surgeons, Chicago, Oct. 21-25. Dr. Frederic A. Besley, 40 East Erie St., Chicago, Secretary.
- American Public Health Association, Detroit, Oct. 8-11. Dr. Reginald M. Atwater, 50 West 50th St., New York, Executive Secretary.
- American Roentgen Ray Society, Boston, Oct. 1-4. Dr. Carleton B. Peirce, Royal Victoria Hospital, Montreal, Canada, Secretary.
- American Society of Anesthetists, New York, Oct. 10. Dr. Paul M. Wood, 745 Fifth Avenue, New York, Secretary.
- American Society of Tropical Medicine, Louisville, Ky., Nov. 12-15. Dr. E. Harold Hinman, Malaria Control Division, Wilson Dam, Ala., Secretary.
- Association of Military Surgeons of the United States, Cleveland, Oct. 10-12. Dr. H. L. Gilchrist, Army Medical Museum, Washington, D. C., Secretary.
- Central Society for Clinical Research, Chicago, Nov. 1-2. Dr. Carl V. Moore, Washington University School of Medicine, St. Louis, Secretary.
- Clinical Orthopaedic Society, Milwaukee and Madison, Wis., Oct. 18-19. Dr. Myron O. Henry, 825 Nicolet Ave., Minneapolis, Secretary.
- District of Columbia, Medical Society of the, Washington, Oct. 15-17. Mr. Theodore Wiprud, 1718 M St., N.W., Washington, Secretary.
- Indiana State Medical Association, French Lick, Oct. 29-31. Mr. Thomas A. Hendricks, 23 East Ohio St., Indianapolis, Executive Secretary.
- Inter-State Postgraduate Medical Association of North America, Cleveland, Oct. 14-18. Dr. W. B. Peck, 27 East Stephenson St., Freeport, Ill., Managing Director.
- Nevada State Medical Association, Las Vegas, Oct. 11-12. Dr. Horace J. Brown, 120 North Virginia St., Reno, Secretary.
- New York State Association of Public Health Laboratories, Albany, Nov. 1. Miss Mary B. Kirkbride, New Scotland Avenue, Albany, Secretary.
- Omaha Mid-West Clinical Society, Omaha, Oct. 28-Nov. 1. Dr. J. D. McCarthy, 107 South 17th St., Omaha, Secretary.
- Pacific Coast Society of Obstetrics and Gynecology, San Francisco, Nov. 6-9. Dr. T. Floyd Bell, 400 Twenty-Ninth St., Oakland, Calif., Secretary.
- Pennsylvania, Medical Society of the State of, Philadelphia, Sept. 30-Oct. 3. Dr. Walter F. Donaldson, 500 Penn Ave., Pittsburgh, Secretary.
- Southern Medical Association, Louisville, Ky., Nov. 12-15. Mr. C. P. Loran, Empire Bldg., Birmingham, Ala., Secretary.
- Southwestern Medical Association, Tucson, Ariz., Nov. 21-23. Dr. M. P. Spearman, 1001 First National Bank Bldg., El Paso, Texas, Secretary.
- Vermont State Medical Society, Rutland, Oct. 9-10. Dr. B. F. Cook, 154 Bellevue Ave., Rutland, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Cancer, New York

39:309-462 (July) 1940

- Experimental Studies on Relation of Pregnancy to Leukemia. J. H. Burchenal, New York.—p. 309.
- Increase in Incidence of Lymphomatosis in Male Fowls by Castration. D. Marine and S. H. Rosen, New York.—p. 315.
- Direct and Indirect Effects of Roentgen Radiation on Blood Forming Organs of Rats. C. L. Hsu and W. C. Ma, Peiping, China.—p. 319.
- Spontaneous Primary Carcinoma of Prostate in Monkey (Macaca Mulatta). E. T. Engle and A. P. Stout, New York.—p. 334.
- Effect of Fat on Tumor Formation. H. P. Jacobi and C. A. Baumann, Madison, Wis.—p. 338.
- Rhabdomyosarcomatous Pulmonary Metastases from Teratoma Testis. M. D. Bosse, Pittsburgh.—p. 343.
- Genetic Analysis of Induction of Tumors by Methylcholanthrene: Note on Origin of NH Strain of Mice. L. C. Strong, New Haven, Conn.—p. 347.
- Effect of Hormones on Cells Grown in Vitro: I. Effect of Sex Hormones on Fibroblasts. E. Von Haam and L. Cappel, Columbus, Ohio.—p. 350.
- Id.: II. Effect of Hormones from Thyroid, Pancreas and Adrenal Gland. E. Von Haam and L. Cappel, Columbus, Ohio.—p. 354.
- Specific Precipitin Antiserum for Carcinoma Protein. L. S. Mann and W. H. Welker, Chicago.—p. 360.
- Further Experiments on Effect of Carcinogenic Hydrocarbons on Elimination of Congo Red from Circulation. Cornelia Hoch-Ligeti, London, England.—p. 365.
- Carcinogenic Properties of Ortho-Amidoazotoluol. H. C. Vassiliadis, Athens, Greece.—p. 377.
- Fraction of Human Urine Causing Fetus Resorption in Rats and Mice. J. O. Ely, Philadelphia.—p. 379.
- Chemical Compounds as Carcinogenic Agents: Second Supplementary Report: Literature of 1938 and 1939. J. W. Cook, London, England, and E. L. Kennaway, Glasgow, Scotland.—p. 381.

American J. Digestive Diseases, Huntington, Ind.

7:323-364 (Aug.) 1940

- Analysis of 256 Gastrosopies Performed at Bellevue Hospital. J. Flexner and A. Fleishman, New York.—p. 323.
- *Management of Acute Cholecystitis. J. E. Berk, Philadelphia.—p. 325.
- Color Photography Through the Sigmoidoscope. Z. Bercovitz and C. C. Fuller, New York.—p. 332.
- Effect of Various Bile Acids on Volume and Certain Constituents of Bile. A. L. Berman, E. Snapp, A. C. Ivy, A. J. Atkinson and V. S. Hough, Chicago.—p. 333.
- Notes on Some Recent Books on Psychoneuroses and Minor Psychopathies. W. C. Alvarez, Rochester, Minn.—p. 346.

Management of Acute Cholecystitis.—Berk presents arguments advanced by the group who regard acute cholecystitis as an immediate surgical emergency and the group who contend that operation should be delayed until the acute stage has subsided. He concludes that: 1. Acute cholecystitis is usually dependent on an obstruction to the outlet of the gallbladder with interruption in the blood supply to the organ. In more than 92 per cent of cases the obstructing agent is a calculus. Secondary infection of the ischemic areas may be present. 2. Acute cholecystitis is a dangerous condition. Under conservative treatment about 25 per cent of the patients will get worse. Complications such as empyema, gangrene, perforation of the gallbladder and generalized peritonitis occur frequently. 3. There is no dependable correlation between the severity of the clinical manifestations and the severity of the disease. It is impossible to predict the outcome. 4. Statistics show that the mortality is great among the "early" operations done after the symptoms have been present for forty-eight hours. Operations done within forty-eight hours have had the lowest mortality rate. Unfortunately few patients reach a hospital within this interval. 5. It is inadvisable to operate on every patient seen within this time as many diagnoses will be wrong. 6. Patients and the disease vary widely and the

treatment must be individualized. 7. A plan of procedure which has been employed successfully in the management of patients is as follows: immediate hospitalization and immediate operation when perforation and peritonitis are present and conservative treatment, if the condition permits, for twenty-four or thirty-six hours followed by operation if the general condition does not improve; a conservative attitude is maintained if improvement is noted.

American Journal of Medical Sciences, Philadelphia

200:145-288 (Aug.) 1940

- *Pernicious Anemia: Erythrocyte Response to Treatment. M. C. Riddle, Portland, Ore.—p. 145.
- Blood of Newborn Rats After Oral Administration to Mother of Normal and Abnormal Human Gastric Juice. C. P. Schlicke, Rochester, Minn.—p. 155.
- Hemolytic Anemia and Hepatic Degeneration Cured by Splenectomy. G. E. Farrar Jr., W. E. Burnett and A. J. Steigman, Philadelphia.—p. 164.
- Erythrocyte Morphology in Experimental Hemolytic Anemia as Induced by Specific Hemolysin. W. D. Tigert and C. N. Duncan, with technical assistance of A. J. Hight, Dallas, Texas.—p. 173.
- Effects of Sulfanilamide and Sulfapyridine on Blood Pigments of White Rats. P. K. Smith, New Haven, Conn.—p. 183.
- Coronary Embolism: Complication of Syphilitic Aortitis: Report of Three Cases. W. B. Porter and E. W. Vaughan, Richmond, Va.—p. 184.
- Dissecting Aneurysm of Aorta with Experimental Atherosclerosis. S. Weiss, Boston; T. D. Kinney and Mary M. Maher, New Haven, Conn.—p. 192.
- *Complete Occlusion of Abdominal Aorta: Review of Seven Cases. H. Gross and B. Philips, New York.—p. 203.
- Value of Ether Circulation Time in Diagnosis of Right Heart Failure. S. Baer and H. J. Isard, Philadelphia.—p. 209.
- Human Sternal Bone Marrow in Hyperthyroid and Myxedematous States. R. M. Jones, Chicago.—p. 211.
- Quantitative Study of Height of Thyroid Acinar Cells in Normal and Abnormal Thyroids. M. S. Abel, Philadelphia.—p. 220.
- Influence of Estrogen on Insulin Requirement of the Diabetic. Anna R. Spiegelman, New York.—p. 228.
- Calcium and Phosphorus in Cerebrospinal Fluid in Diabetes Insipidus. H. Blotner, Boston.—p. 235.
- Maintenance of Nitrogen Equilibrium of Amino Acids Administered Parenterally. S. S. Altschuler, Detroit; Hilda M. Hensel, Eloise, Mich., and M. Sahyun, Detroit.—p. 239.
- Vitamin C Nutrition in Pellagra. Grace A. Goldsmith, A. T. Ogaard, New Orleans, and D. F. Gowe, Ponce, Puerto Rico.—p. 244.
- Comparative Study of Boerner-Lukens Complement Fixation Test. R. A. Kilduffe and Doris B. Davis, Atlantic City, N. J.—p. 249.
- Acute Lymphocytic Choriomeningitis: Report of Three Cases with Histopathologic Findings. W. L. Silcott and K. Neuburger, Denver.—p. 253.
- Certain Factors Governing Incidence of Cerebrovascular Crises. D. L. Dozzi, Philadelphia.—p. 259.
- Effect of Partial Hepatectomy on Action of Certain Barbiturates and Phenylurea Derivative. C. H. Scheffey and G. M. Higgins, Rochester, Minn.—p. 264.

Pernicious Anemia: Erythrocyte Response to Treatment.—Riddle points out that Minot and his associates, soon after their discovery of the therapeutic effectiveness of liver in pernicious anemia, recognized certain quantitative relationships between the erythrocyte count before treatment, the dose of liver employed in treatment, the number of reticulocytes which appeared early in remission, and the increase in the erythrocyte count. They were impressed particularly by the importance of the large number of reticulocytes in the blood in the first phase of the remission following liver therapy, and they and others devised mathematical equations which represent the numbers or percentage of reticulocytes which may be expected to appear in individual patients with pernicious anemia adequately treated. Although these standard reticulocyte equations have proved useful their value has been disputed, particularly by Murphy. Riddle cites Murphy to the effect that rise in the erythrocyte count would be a far simpler method of evaluating the treatment than the reticulocyte response, if the expected erythrocyte increase were expressed in as simple and as accurate form as the standard reticulocyte equations. The author studied a large number of remissions to determine the quantitative relationships between the rate of erythrocyte increase and the erythrocyte count before treatment. From data of 523 patients with pernicious anemia satisfactorily treated, the average weekly increase in the erythrocyte count at the end of two weeks of treatment was found to bear an inverse relationship to the erythrocyte count before treatment. This relationship is expressed in the equation $I = 0.78 - 0.174E_0$, where I is the average weekly increase in the erythrocyte count after two weeks of treatment and E_0 the

erythrocyte count before treatment expressed as millions of erythrocytes per cubic millimeter of blood. This equation is suggested as a standard for measuring the relative effectiveness of treatment in pernicious anemia. Observed values equal to or greater than those obtained from this equation indicate adequate treatment. Observed values less than those calculated from the equation indicate inadequate treatment. The existence of various complicating factors such as concurrent disease, transfusion or hemorrhage in association with pernicious anemia invalidate the use of this standard.

Complete Occlusion of Abdominal Aorta.—According to Gross and Philips, complete occlusion of the aorta at its bifurcation has been associated clinically with a well delineated group of symptoms. The classic syndrome is one of acute onset with severe pain and loss of sensation in the legs, absence of arterial pulsations and rapidly progressive ascending gangrene of the lower extremities with fatal outcome. In a study of the clinical course of patients in whom, at postmortem, complete obstruction of the aorta was found at its bifurcation, the authors have found that this clinical picture is not constant. They present seven cases of complete occlusion of the aorta at its bifurcation, observed among 5,350 necropsies. Of these, four were patients with atherosclerosis of the coronary arteries and aorta, two with diffuse vascular disease involving the venous system and one with chronic rheumatic cardiovalvular disease, auricular fibrillation and a ball-valve thrombus of the left auricle. The classic clinical picture usually associated with complete occlusion of the aorta at its bifurcation occurred in only one of the first group of four. In another of this group there was nothing in the clinical course to suggest involvement of the aorta but at postmortem the bifurcation was completely occluded by an old gray thrombus. Of interest in the other two is the rapid progress of gangrene with speedy involvement of the opposite extremity. In the two cases with diffuse vascular disease, the aortic involvement seemed to be a mere incident in the course of a progressive disease involving the entire arterial tree with an arteritis in one and venous involvement in the other. The last case resembles in almost every detail the cases described in the literature in which complete occlusion at the bifurcation of the aorta occurred as a complication of chronic rheumatic heart disease with arrhythmia and intracardiac thrombi. The differentiation of embolism from thrombosis as a cause of occlusion of the aorta is difficult. Welch thought that a decision as to the existence of one or the other is often guesswork. Neuhoof pointed out that the mode of onset does not indicate whether one is dealing with embolism or thrombosis, since thrombosis may set in with severe acute symptoms and embolism may produce only intermittent claudication for a long time or no symptoms depending on the size of the vessel and the collateral circulation. The authors think that the departure from the classic clinical syndrome in six of their seven cases were probably due to (1) differences in the rate of progression of the occlusion, (2) the presence of an adequate collateral circulation and (3) subsequent development of a more efficient anastomotic circulation.

American Journal of Pathology, Boston

16:375-524 (July) 1940

- Cardiac Lesions in Libman-Sacks Disease: Consideration of Its Relationship to Acute Diffuse Lupus Erythematosus. L. Gross, New York.—p. 375.
- Histologic Changes in Ischemic Kidney, with Special Reference to Juxtaglomerular Apparatus. N. Goormaghtigh, Ghent, Belgium.—p. 409.
- Histogenesis of Induced Pulmonary Tumors in Strain A Mice. H. G. Grady and H. L. Stewart, Bethesda, Md.—p. 417.
- Histologic Lesion in Lymph Nodes in Infectious Mononucleosis. E. A. Gall and H. A. Stout, Boston.—p. 433.
- Splenic Reticulum Cell Tumors in Mice. J. Furth and N. Krumdieck, New York.—p. 449.
- Transmissible Malignant Neoplasm of Mice Originating in Reticular or Endothelial Cells. W. A. Barnes and J. Furth, New York.—p. 457.
- Primary Encephalomyelitis in Goats Associated with *Listeria* Infection. L. S. King, Princeton, N. J.—p. 467.
- Solitary Granuloma of Bone Simulating Primary Neoplasm. S. Otani and J. C. Ehrlich, New York.—p. 479.
- Effects of Ovariectomy and Long Continued Administration of Anterior Pituitary Extract of Cattle on Skeletal Tissues of Immature Guinea Pigs. M. Silberberg and Ruth Silberberg, St. Louis.—p. 491.
- Effect of Thyroidectomy and Administration of Anterior Pituitary Extract of Cattle on Growth of Cartilage and Bone of Immature Guinea Pigs. M. Silberberg and Ruth Silberberg, St. Louis.—p. 505.

Annals of Internal Medicine, Lancaster, Pa.

14:1-200 (July) 1940

- *Clinical Application of Thiochrome Reaction in Study of Thiamine (Vitamin B₁) Deficiency. H. J. Borson, San Francisco.—p. 1.
- Vitamin Deficiencies in Gastrointestinal Disease. T. T. Mackie, W. H. Eddy and M. A. Mills, New York.—p. 28.
- Relation Between Clinical Edema and Excretion of Antidiuretic Substance in Urine. F. H. Robinson Jr. and L. E. Farr, New York.—p. 42.
- *Treatment of Chronic Ulcerative Colitis with Sulfanilamide. E. N. Collins, Cleveland.—p. 55.
- Concerning Correlation of Pathology and Symptoms of Coronary Artery Disease. F. M. Smith, Iowa City.—p. 65.
- Malarial Coma. C. H. Sanford, P. T. Crawford and O. S. Warr Jr., Memphis, Tenn.—p. 72.
- Effect of Oxalic Acid Intravenously on Blood Coagulation Time in Three Hemophiliacs. R. C. Page, H. K. Russell and R. L. Rosenthal, New York.—p. 78.
- Prevention of Arthritic Deformities by Early Orthopedic Management. J. P. Stump, New York.—p. 87.
- Cardiac Aneurysm: Report of Ten Cases. W. Dressler, New York, and R. Pfeiffer, Vienna, Austria.—p. 100.
- Studies in Metabolism of Dextrose Fragments in Man. Frances F. Beck, Ruth Musser, C. J. Carr and J. C. Krantz Jr., Baltimore.—p. 122.
- Treatment of Pneumococcal Pneumonia with Sulfapyridine. K. G. Kohlstaedt and I. H. Page, Indianapolis.—p. 129.
- The American Board of Internal Medicine After Four Years; Organization, Purposes and Effects of Special Boards on Medical Education and Practice. E. E. Irons, Chicago.—p. 146.

Thiochrome Reaction and Thiamine Deficiency.—Borson outlines a modification of the thiochrome reaction of Jansen which provides an easy, rapid and accurate method for the chemical assay of thiamine (vitamin B₁) in urine. Subjects taking a diet adequate in thiamine excrete from 100 to 300 micrograms of thiamine daily. Of a standard oral test dose of 0.1 mg. per kilogram of weight from 8 to 10 per cent is excreted; most of the excess is found in the first five hours. The utilization of thiamine supplements depends in part on the degrees of absorption and excretion; large oral doses are incompletely absorbed and large parenteral doses are rapidly excreted. Therefore small frequent doses are utilized most efficiently. Excretion reflects intake with great sensitivity, even slight degrees of subsaturation being easily detected. The extent of deficiency may be estimated by determining the number of test doses required for the excretion to rise to normal. In patients with severe thiamine deficiency the total amount required for the excretion to become normal was tentatively estimated at about 100 mg. Evidence is presented that thiamine is a *nonthreshold* substance. Diuresis may wash out a considerable amount, thus contributing to the development of deficiency. The excretion in diffuse liver disease may be much higher than normal. This is interpreted as evidence that the ability to phosphorylate thiamine for utilization and storage is impaired. Moderate deficiencies found in patients with thyrotoxicosis despite diets containing fair amounts of "protective foods" may be explained by the increase in the metabolic rate and the consequent increase in the thiamine requirement. Several patients with "neuritis" of uncertain origin, having significant deficiencies, experienced definite relief after thiamine feeding. This indicates that thiamine deficiency played a part in the etiology, although typical thiamine deficiency disease was not present. Marked subsaturation occurred in 50 per cent of patients with multiple sclerosis and 29 per cent experienced definite symptomatic improvement after the oral administration of thiamine. The deficiency probably was secondary as the primary disease was not influenced by the treatment. Deficiencies were found frequently in patients with dorsolateral sclerosis and miscellaneous diseases of the central nervous system. Eighty per cent of patients with central nervous system syphilis were found to be undersaturated with thiamine; 58 per cent were definitely improved following pure thiamine therapy. There appears to be a definite indication for thiamine as a therapeutic measure in tic douloureux. Long-continued administration may be necessary in some patients before improvement will begin. Thiamine feeding was curative in a patient with nonspecific diarrhea, who also recovered from an idiosyncrasy to milk. Thiamine deficiency was frequent in patients with mild degrees of chronic disease of various types. Symptoms which are attributed to the primary disease or to "functional" disorders may be present in these patients and, because the classic picture of deficiency disease is absent, diagnosis can be made only by the therapeutic test. By estimating

the urinary excretion, asymptomatic deficiencies can be readily discovered and the test placed on a sounder basis in the diagnosis of deficiencies associated with symptoms.

Sulfanilamide for Chronic Ulcerative Colitis.—Collins appraises the use of sulfanilamide in the treatment of thirty-three cases of ulcerative colitis, azosulfamide in five and azosulfamide subsequent to sulfanilamide in six. The type treated corresponds to that described by Bergen and Buie as "thrombo-ulcerative colitis." The process was diffuse, inflammatory, destructive and hyperplastic, seen at proctosigmoidoscopic examination, while x-ray examination showed it to extend toward the colon. Sulfanilamide was given by retention enema not exceeding 45 grains (3 Gm.) in twenty-four hours. If the drug is well tolerated it is used for from ten to fourteen days and then on alternate weeks for two or three months with an interval of rest of from one to three months after each course, depending on the clinical course and the results. The enemas are given four times a day but not close to mealtime because of the gastrocolic reflex. Because of the tendency of the disease to recur it is important to use the drug in intermittent courses even after there is no evidence of activity. Since azosulfamide became available, its lower toxicity to sulfanilamide has been established and it has been given only by mouth, a total of 75 grains (5 Gm.) in five divided doses in twenty-four hours. The initial period of use and its intermittent use thereafter are similar to that of sulfanilamide. With continued improvement the daily dosage is reduced and the periods without the drug are lengthened. A complete and continued remission has occurred in eight, or 60 per cent, of thirteen nontoxic cases. In several instances it has lasted over more than two years. In ten (76 per cent) sulfanilamide was considered valuable and was the only treatment used. Further sulfanilamide proved to be of significance in producing favorable responses in fifteen of twenty-six nontoxic and toxic cases, or 57 per cent. Death occurred in four instances subsequent to the use of sulfanilamide. All four patients had extensive, if not irreparable, damage to the entire colon and were severely toxic at the time of admission. Multiple perforations of the colon were found at the time of operation in two patients; the third patient was 76 years of age and died after an operation for prostatic obstruction. Sulfanilamide was administered to the fourth patient for only six days. Ileostomy has been performed on three other severely toxic patients after sulfanilamide therapy failed. In combining these three cases with ten toxic cases in which medical management was employed, a remission attributable to sulfanilamide occurred in only four, or 30 per cent, of this group. Sulfanilamide has a place in the treatment of chronic ulcerative colitis and should be considered an adjunct to the usual forms of treatment and not as a specific remedy. It has proved of greatest value in the early nontoxic stage of the disease.

Archives of Internal Medicine, Chicago

66:295-530 (Aug.) 1940

- Significance of Albumin-Globulin Ratio of Serum. D. Melnick, H. Field Jr. and C. G. Parnall Jr., Ann Arbor, Mich.—p. 295.
- Practical Method for Measurement of Glomerular Filtration Rate (Inulin Clearance), with Evaluation of Clinical Significance of This Determination. A. S. Alving and B. F. Miller, Chicago.—p. 306.
- *Purpura Haemorrhagica Due to Arspenamines: Sensitivity in Patients as Influenced by Vitamin C Therapy. E. H. Falconer, N. N. Epstein and Edith S. Mills, San Francisco.—p. 319.
- Dermatomyositis and Systemic Lupus Erythematosus: II. Comparative Study of Essential Clinicopathologic Features. H. Keil, New York.—p. 339.
- Arteritis of Temporal Vessels: Report of Case. J. M. Bowers, Seattle.—p. 384.
- Body Build and Hypertension. S. C. Robinson and M. Brucer, Chicago.—p. 393.
- *Diagnosis and Treatment of Gonorrheal Septicemia and Gonorrheal Endocarditis. J. S. Davis Jr., New York.—p. 418.
- Bacterial Endocarditis and Syphilis of Aortic Valve. D. H. Rosenberg, Chicago.—p. 441.
- Survey of Diabetes: Statistical Data and Control Comparisons with Various Insulins. B. Smith and W. H. Grishaw, Los Angeles.—p. 465.
- Infectious Diseases: Review of Significant Publications in 1939-1940. H. A. Reimann, Philadelphia.—p. 478.

Purpura from the Arspenamines.—Falconer and his co-workers studied the effects of arspenamines on seven patients who had toxic reactions accompanied by thrombopenic purpura following arspenamine therapy. These patients have submitted

to further injections, reproducing experimentally their attacks of purpura and affording an opportunity to study the effects of oral and parenteral administration of vitamin C on their sensitivity. Six of the patients were known to be sensitive to nearsphenamine and only one to bismarsen. The previous reactions of these patients following each administration of nearsphenamine or bismarsen varied from almost no symptoms in one to marked prostration, nausea, vomiting, rapid pulse, chills and malaise followed in each instance by thrombopenic purpura. Up to this time no vitamin C had been administered. The diet of each patient was inquired into carefully and the intake of vitamin C of only one patient was deemed inadequate. The amounts taken and the intervals during which the patients took vitamin C in crystalline form as ascorbic acid orally and intravenously varied considerably. It was impossible to standardize the sensitivity reaction to a given amount of the arspenamine preparation causing a reaction. The variation of the reaction to different amounts of the drug was marked in the same patient at various time intervals. Variation in the different patients of the series was considerable and appeared as a distinctly individual characteristic. At no time and in no patient was there any appreciable modification of sensitivity reaction during or after the administration of vitamin C. An increase in severity of the reactions after administration of vitamin C in certain of the patients was probably due entirely to increased sensitivity as the result of previously administered arspenamine.

Gonorrheal Septicemia and Endocarditis.—Davis believes that a discussion of gonorrheal septicemia and endocarditis is timely because the condition apparently is not uncommon. The diagnosis is either missed or not made until after death at post-mortem examination and because fever therapy, sulfanilamide and its derivatives are means with which the infections may be combated. The data of fourteen cases, with four recoveries, are reported. Thirteen cases were thought to be endocarditis and one a pericarditis. Two of the patients were seen by the author. The patients who recovered were not proved definitely to have gonorrheal septicemia, but the author gives the following fourteen points which in his case he believes should substantiate such a diagnosis: a positive gonococcus complement fixation test, no petechiae, varying heart murmurs from day to day, no change in conduction time of the heart as would be expected in a rheumatic infection, indication after bouts of pneumonia that the invading organism was sensitive to heat, fluid removed from the cavity in the chest cloudy and apparently sterile (similar observations are made in gonorrheal pleurisy), a history of a severe previous attack of gonorrhea and recent alcoholic and sexual excesses, recovery following multiple blood transfusions and Corbus-Ferry filtrate therapy, five attacks of pneumonia which was probably embolic, the presence of jaundice probably due to hemolysis, a palpable spleen, gallop rhythm on three occasions, severe abdominal pain (probably embolic in character) for which an exploratory operation was performed and evidence of renal infarct. Death in this disease is often of renal origin. The diagnosis is simple in those cases in which the acute disease follows trauma to the urethra in the course of therapy for acute gonorrhea. The author believes that if his foregoing observations are kept in mind an earlier diagnosis may be made, which will prevent useless major operations and explorations of the chest and will hasten the patient's recovery. If sulfanilamide or fever therapy could be used early in the disease, the mortality could be much reduced. A study of the data reveals (1) the difficulty in establishing a definite diagnosis, which is often not made until after death, (2) the frequent occurrence of pneumonia, (3) the infrequency of petechiae and the peculiarity of the cutaneous lesion, (4) the difficulty attendant on obtaining a positive blood culture and (5) the fact that recovery is possible. Accepted forms of treatment seem to be (1) sulfanilamide up to 150 grains (10 Gm.) daily, (2) artificial fever induced by the Kettering hyperthermia, (3) blanketing the patient, thus utilizing the patient's body heat to maintain a fever, (4) multiple blood transfusions and (5) surgical removal of any focus of infection (frequently never found even at necropsy). Sulfanilamide must be given with great caution so as not to deplete the leukocytes and erythrocytes.

Archives of Ophthalmology, Chicago

24:221-438 (Aug.) 1940. Partial Index

- *Methods for Visual Testing in Schools. J. B. Hitz, Milwaukee.—p. 221.
Site of Disturbance in Adie's Syndrome. H. G. Scheie, Philadelphia.—p. 225.
Phi Phenomenon and Anomalous Projection. F. H. Verhoeff, Boston.—p. 247.
Clinicopathologic Study of Diabetic Retinitis. S. A. Agatston, New York.—p. 252.
Studies of Visual Fields in Connection with Tryparsamide Therapy. L. S. Powell, Lawrence, Kan., and H. S. Smith, Osawatomic, Kan.—p. 276.
Local Action of Oils Containing Vitamin A: Experimental Contribution. A. de Rôth, Spokane, Wash.—p. 281.
More Nearly Absolute Method of Testing and Rating Vision. C. E. Ferree and G. Rand, Baltimore.—p. 292.
Studies in Convulsant Therapy: IV. Effects of Metrazol (Pentamethyl-enetetrazol) on Eye. S. R. Dean, Newtown, Conn.—p. 316.
Acute Hydrops of Cornea Complicating Keratoconus. R. O. Rychener, Memphis, Tenn., and D. B. Kirby, New York.—p. 326.
Ocular Sensitivity to Nupercaine. C. A. Perera, New York.—p. 344.
Vaccinal Disciform Keratitis Following Accidental Inoculation of Eyelid. C. A. Perera, New York.—p. 352.
Rhinosporidiosis of Conjunctiva. H. D. Barnshaw and W. T. Read Jr., Camden, N. J.—p. 357.
Vaccinia of Eyes. J. Laval, New York.—p. 367.
Pathologic Conditions of Cornea: I. Disturbances of Epithelium, Endothelium and Bowman's and Descemet's Membrane. B. Rones, Washington, D. C.—p. 374.

Methods for Visual Testing in Schools.—Hitz compared the results of the Snellen chart test, the Betts test and a group of tests (hereafter referred to as the author's tests) consisting of the Snellen chart at 6 meters, the Duane screen test at 6 meters and 33 cm. and the Worth four dot test at 6 meters and 33 cm. The tests were performed by lay examiners on 745 average school children between the ages of 8 and 16. None of the tests were to be considered diagnostic but merely a means of determining which children should be referred to an ophthalmologist for a complete examination. The percentages of those who passed and failed were, respectively, Snellen test 89.7, 10.3; Betts test (the Betts method of grading) 17.4, 82.6; Betts test (the Davenport, Iowa, method of grading) 58.4, 41.6, and his group of tests 55.4 and 44.6. It seems obvious that any test which finds 82 per cent of school children with defective vision is too discriminating and defeats its own purpose. If such were the case it would be more sensible to refer all children to an ophthalmologist and eliminate screen testing. The figures further suggest that the Snellen test alone is missing a considerable number of muscular and fusional difficulties. A comparison of the results obtained with the Snellen test with those obtained with the Betts visual acuity test shows the Betts test to be slightly more discriminating. A comparison of the results of the fusion tests with those of the four dot test reveals that the Betts test again shows the greater percentage of failures. A comparison of the results of the muscle balance tests with those of the Betts test shows that the Betts test reveals more failures. A criticism of the Betts test is that the time consumed in examining the individual person is almost double that with his group of tests. The author believes that his group of tests would seem to strike a mean between the other two tests considered. The tabulated results warrant the conclusion that the tests in present use are either inadequate or overzealous and that a further effort toward the development of standard visual efficiency tests to be used in the nation's schools should be made.

Arkansas Medical Society Journal, Fort Smith

37:57-74 (Aug.) 1940

- Convalescent Serum in Prophylaxis and Treatment of Communicable Diseases. S. G. Wolfe, Shreveport, La.—p. 57.
Management of Normal Labor. G. L. Kimball, DeQueen.—p. 62.

Bulletin New York Academy of Medicine, New York

16:501-552 (Aug.) 1940

- Features Which Suggest Public Health Consideration of Rheumatic Fever. H. F. Swift, New York.—p. 501.
Clinical Aspects of Rheumatic Fever in Adults. I. R. Roth, New York.—p. 514.
Management of Anemias in Infancy and Childhood. C. H. Smith, New York.—p. 525.
Convalescence in Coronary Disease, with Special Reference to the Saratoga Spa Therapy. C. R. Comstock, Saratoga Springs, N. Y.—p. 546.

Johns Hopkins Hospital Bulletin, Baltimore

67:79-162 (Aug.) 1940

- Retinal Arteries in Experimental Renal Hypertension: Significance of Localized Caliber Constriction. R. C. Laughlin, Caroline Bedell Thomas and J. S. Friedenwald, Baltimore.—p. 79.
Toxin Antitoxin Reactions in Experimental Tetanus. H. B. Shumacker Jr., W. M. Firor and A. Lamont, Baltimore.—p. 92.
Studies in Thiamine Excretion. V. A. Najjar and L. E. Holt Jr., Baltimore.—p. 107.
Functional Studies Following Lesions of Cerebellar Vermis Involving Nucleus Fastigii. R. S. Snider.—p. 125.
Functional Studies Following Lesions of Nucleus Interpositus in Rabbit. R. S. Snider.—p. 139.

Journal of Nutrition, Philadelphia

20:99-196 (Aug.) 1940. Partial Index

- Ascorbic Acid Content of Goat's Milk and Blood: Influence of Ascorbic Acid Injection and Diet. Martha S. Richmond, G. H. Satterfield, C. D. Grinnells and W. J. Dann, Raleigh and Durham, N. C.—p. 99.
Effect of Complementing Factors on Quantitative Response and Specificity of Vitamin B₆. G. C. Supplee, R. C. Bender and O. J. Kahlenberg, Bainbridge, N. Y.—p. 109.
Cereals and Rickets: XII. Effect of Calcium and Vitamin D on Availability of Phosphorus. C. H. Krieger and H. Steenbock, Madison, Wis.—p. 125.
Effects Produced by Decreasing Calcium and Phosphorus Intake on Calcium and Phosphorus Absorption and Deposition and on Various Bodily Constituents of Rat. G. Bachmann, J. Haldi, W. Wynn and C. Ensor, Emory University, Ga.—p. 145.
Biologic Assay of Riboflavin in Liver of Cow, Calf, Sheep, Lamb and Hog. Olga B. Saffry, Hazel S. Cox, Bernice L. Kuerth and Martha M. Kramer, Manhattan, Kan.—p. 169.
Histologic Studies of Tissues of Rats Fed Diet Extremely Low in Phosphorus. R. H. Follis Jr., H. G. Day and E. V. McCollum, Baltimore.—p. 181.

New England Journal of Medicine, Boston

223:205-238 (Aug. 8) 1940

- Surgical Treatment of Carcinoma of Prostate. J. A. C. Colston, Baltimore.—p. 205.
Riboflavin Deficiency: Report of Case in Child with Cure by Specific Treatment. W. P. Shields, Providence, R. I.—p. 215.
Erythema Multiforme Bullosum with Involvement of Mucous Membranes of Eyes and Mouth (Stevens-Johnson Disease): Report of Case. H. Ageloff, New York.—p. 217.
Pharmacology. G. P. Grabfield, Boston.—p. 220.

223:239-264 (Aug. 15) 1940

- Hypovitaminosis of All Fat Soluble Vitamins Due to Steatorrhea: Report of Case. F. Albright and J. D. Stewart, Boston.—p. 239.
*Recovery from Acute Rheumatic Fever Without Permanent Cardiac Damage. M. G. Brown and L. Wolff, Boston.—p. 242.
Infections of Upper Urinary Tract in Diabetic Patient. A. D. Baldwin and H. F. Root, Boston.—p. 244.
Radiation Therapy. R. Dresser, Boston.—p. 250.

Recovery from Rheumatic Fever Without Cardiac Damage.—This study by Brown and Wolff is based on 175 consecutive unselected cases of acute rheumatic fever, with or without chorea. Only cases in which the diagnosis was clear were included. Following the acute attack they were seen in the cardiac clinic of the outpatient department on repeated occasions over periods varying between four and eleven years, and most of them were seen for the final evaluation of their cardiac status. In arriving at the final opinion, the physical examination, the electrocardiogram, the 7 foot roentgenogram of the heart and the fluoroscopic examination for chamber enlargement were taken into consideration. In this series there were eighty-nine patients who developed or already had valvular damage as a result of rheumatic fever. Patients presenting loud and constant systolic murmurs as the only cardiac abnormality were included in this group. The remaining eighty-six cases were divided into three groups. Group 1 included twenty-one patients who at no time showed murmurs or other evidence of cardiac involvement. Group 2 consisted of twenty-nine patients in whom, at the time of rheumatic activity, murmurs and other evidences of cardiac involvement were present but subsequently disappeared. Group 3 included thirty-six patients who showed a persistent but inconsequential systolic murmur. The present study confirms the known fact that some patients with acute rheumatic fever escape permanent organic valvular damage. The proportion of those escaping permanent cardiac damage is higher in this series (50 per cent) than in any other published series. It is generally believed that, the more severe the infection or the greater the number of recurrences, the more apt is the patient to develop perma-

ment cardiac injury. This belief is not substantiated by the observations here reported. The rheumatic infection in the patients who recovered without permanent heart disease was no different clinically from that in the others. There was no difference in the duration. Of the eighty-six patients who escaped permanent cardiac damage, forty-two had multiple attacks of rheumatic fever. Thus patients who recover without permanent organic heart changes from a first attack seem to have an excellent chance of doing so from subsequent ones. This conclusion is of prognostic and therapeutic significance and makes possible the less rigid restriction of activity of certain patients during subsequent attacks of active rheumatic infection. The final evaluation of the state of the valves must be delayed for several years after an attack of rheumatic fever.

Physiological Reviews, Baltimore

20:313-468 (July) 1940

- Carbon Monoxide Anoxemia. Esther M. Killick, London, England.—p. 313.
Fluctuations in Body Iodine. W. T. Salter, Boston.—p. 345.
Role of Potassium in Physiologic Processes. W. O. Fenn, Rochester, N. Y.—p. 377.
Porphyrins in Health and Disease. K. Dobriner and C. P. Rhoads, New York.—p. 416.

Public Health Reports, Washington, D. C.

55:1327-1370 (July 26) 1940

- Protective Ointment for Prevention of Poison Ivy Dermatitis. L. Schwartz, L. H. Warren and F. H. Goldman.—p. 1327.
Effect of Synthetic Pantothenic Acid on Adrenal Hemorrhage, Atrophy and Necrosis in Rats. F. S. Daft, W. H. Sebrell, S. H. Babcock Jr. and T. H. Jukes.—p. 1333.
Effect of Administration of Pantothenic Acid on Histopathology of Filtrate Factor Deficiency State in Rats. L. L. Ashburn.—p. 1337.

55:1371-1418 (Aug. 2) 1940

- Disease Outbreaks Resulting from Faulty Environmental Sanitation. L. C. Frank.—p. 1373.
Report on Market-Milk Supplies of Certain Urban Communities.—p. 1383.
Susceptibility and Resistance of Certain Species of American Deer Mice, Genus *Peromyscus*, and Other Rodents to *Leptospira Icterohaemorrhagiae*. A. Packchianian.—p. 1389.
Disabling Morbidity Among Male and Female Industrial Workers During 1938 and 1939, and Among Males During the First Quarter of 1940, with Inquiry into Occurrence of Multiple Attacks of Disabling Sickness and Injuries, 1939. W. M. Gafafer.—p. 1402.

Radiology, Syracuse, N. Y.

35:131-260 (Aug.) 1940

- Clinical and Pneumo-Encephalographic Studies in Presenile Dementia. J. Romano and W. C. Miller, Boston.—p. 131.
Radiologic Society of North America Standardization Committee, Technical Bulletin No. 1. Edith H. Quimby and G. C. Laurence.—p. 138.
*Familial Lumbosacral Syringomyelia. C. Van Epps and H. D. Kerr, Iowa City.—p. 160.
The New Alchemy. M. A. Tuve, Washington, D. C., with added remarks by R. R. Newell, San Francisco.—p. 174.
Use of Artificially Produced Radioactive Elements as Tagged Atoms in Biologic Research. W. F. Bale, Rochester, N. Y.—p. 184.
Treatment of Radiation Reactions Following 200 Kilovolt Therapy. Zoe Allison Johnston, Pittsburgh.—p. 192.
Physical Factors of Low Voltage "Contact" Roentgen Therapy. C. B. Braestrup and I. H. Blatz, New York.—p. 198.
Normal Bone Angles and Roentgen Report. R. G. Van Nuys, Berkeley, Calif.—p. 206.
Further Studies on Effects of Irradiation on Proliferation and Metabolic Processes of Normal and Malignant Tissues: IV. Effects Produced by Different Dosage Rates of X-Ray Radiation on Proliferation of Various Tissues Grown in Vitro. Anna Goldfeder, New York.—p. 210.
Additive Effects of Radon and Neutral Red on Chaos Chaos. Vera Koehring, Boston.—p. 229.
"Know Thyself." R. E. Myers, Oklahoma City.—p. 236.

Familial Lumbosacral Syringomyelia.—The appearance at their clinic of two or more members of four different families with trophic changes in the soft and bony tissues of the feet led Van Epps and Kerr to review the literature of similar cases. It is their belief that the various etiologic factors of the syndrome are of the developmental type and that the terms status dysraphicus, myelodysplasia, syringomyelia and trophopathia pedis myelodysplastica all have some basis. They have classified their cases in the syringomyelia group and feel that the term "familial lumbosacral syringomyelia" is the best term. To date there have been reported fifty-four cases, to which the authors

now are adding twenty-seven of their own, making a total of eighty-one cases. They have examined nineteen of the twenty-seven included in this report. Twenty-six of these cases occurred in four families, while in the other case the authors have been unable as yet to establish a familial tendency. Of the nineteen examined cases the feet showed calluses in sixteen, one or more ulcers in seventeen and pain, usually slight, in six. The knee jerks were normal in eighteen, the achilles tendon reflex was absent in twelve and plantar extension was absent in one or both feet in nine. Pallesthesia was impaired or lost in sixteen, hyperkeratosis was present in the hands in two cases, and the skin of the hands was dry and thick in a third case. X-ray examination of the feet showed osseous changes in fifteen cases. These changes were trophic in character—absorption of bone, disintegration of joints, periosteal new bone and pathologic fractures. Soft tissue changes could also be seen. Films of the lumbosacral spine convinced the authors that spina bifida occulta per se is not a necessary part of the syndrome. In four cases there were episodes of severe infection. One case of chronic infection necessitated amputation below the knee. In only one case has there been a possible appearance of the condition in the fourth generation. One family showed an associated case of striate diplegia with athetosis. The sporadic case showed unequal partial Argyll Robertson pupils, primary optic atrophy, and retrobulbar neuritis with slightly constricted fields. This case may be one of tabes, but the authors have included it because they have not seen similar changes in the feet occurring in tabes and because these changes are typical of those in the familial groups. They reach the conclusion that the occurrence of chronic painless ulcers on the feet, especially when associated with x-ray evidence of neurotrophic changes in the bones and joints of the forefeet, should lead to a study of the family history in a search for similar cases. Familial lumbosacral syringomyelia is one of the most frequent causes for such a syndrome. Irradiation of the lumbosacral cord appears to be the best available treatment.

Rocky Mountain Medical Journal, Denver

37:553-636 (Aug.) 1940

- Chronic Gastritis. R. Schindler, Chicago.—p. 570.
Industrial Hygiene. R. R. Sayers, Washington, D. C.—p. 576.
Tuberculosis in Industry. D. E. Cummings, Saranac Lake, N. Y.—p. 579.

Texas State Journal of Medicine, Fort Worth

36:277-342 (Aug.) 1940

- Iron Requirements in Childhood and Adult Life. F. J. Heck, Rochester, Minn.—p. 286.
Hippuric Acid Synthesis Test for Liver Function. D. L. Curb, Galveston.—p. 292.
Metrazol and Insulin Treatment in Psychiatry. A. J. Schwenkenberg and R. E. Winn, Dallas.—p. 296.
Diagnostic and Prognostic Value of Sedimentation Rate. L. C. Kopecky, San Antonio.—p. 302.
Space-Occupying Lesions of Spinal Canal. J. Greenwood Jr., Houston.—p. 305.
Sulfanilamide in Urology. C. M. Simpson, Temple.—p. 311.
How Does the Follicle Reach the Ovarian Surface? E. O. Strassmann, Houston.—p. 313.
Tuberculous Uveitis: Case Report. M. Thomas, Dallas.—p. 319.
Philosophy of the New Deal, a World Problem: A Doctor's Point of View. W. B. Russ, San Antonio.—p. 323.

Virginia Medical Monthly, Richmond

67:465-524 (Aug.) 1940

- Incidence of Pulmonary Tuberculosis in Southwestern State Hospital: Preliminary Report. J. R. Blalock, J. B. Funkhouser and J. E. K. Flannagan, Marion.—p. 465.
Present Status of Serodiagnostic Tests for Syphilis from the Standpoint of the Clinician. D. C. Smith, Charlottesville.—p. 469.
Syphilis in the Pregnant Woman. W. McMann, Danville.—p. 473.
Bipartite Patella. J. L. Tabb, D. M. Faulkner and C. D. Smith, Richmond.—p. 475.
Pyrus Malus, Belonging to Suborder of Pomaceae, of the Natural Order Rosaceae. W. O. Bailey, Leesburg.—p. 479.
Ruptured Intervertebral Disk and Hypertrophied Ligamentum Flava Follow-Up Study. H. L. Skinner, Baltimore.—p. 490.
Sulfapyridine: Uses and Report of Cases. R. H. Temple, Kinston, N. C.—p. 494.
Tuberculosis, Review and Local Study: Five Year Study of Clinic Patients in a City of 34,500 Population. T. N. Hunnicutt Jr., Newport News.—p. 500.
Eosinophilia: Report of Atypical Case. R. D. Garcin Jr., Richmond.—p. 507.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Heart Journal, London

2:141-220 (July) 1940

- Peripheral Circulation by Photoelectric Recording. B. Leibel.—p. 141.
Regeneration in Cardiac Muscle. E. S. J. King.—p. 155.
*Tuberculous Pericarditis. H. L. Heimann and S. Binder.—p. 165.
*Right Ventricular Hypertrophy of Unknown Origin: So-Called Pulmonary Hypertension. S. de Navasquez, J. R. Forbes and H. E. Holling.—p. 177.
Pulmonary Hypertension. T. East.—p. 189.
Failure of Right Ventricle: Case Report. T. G. Armstrong.—p. 201.
Coarctation of Aorta At or Above Origin of Left Subclavian Artery. R. H. Bayley and J. E. Holoubek.—p. 208.
Paroxysmal Tachycardia Caused by Pentamethylene Tetrazol. F. Klein.—p. 213.

Tuberculous Pericarditis.—According to Heimann and Binder, tuberculous pericarditis is not a rare primary clinical manifestation among Bantu people. Observation over fifteen years in the non-European hospital revealed thirty-one cases; some were of the constrictive type which is amenable to operative treatment and some were only part of a generalized tuberculemia; there were none of the healed constrictive type. The finding of a large "pericardial-shaped heart" in a Bantu justifies a clinical diagnosis of tuberculous pericarditis when rheumatic manifestations and evidence of mitral and aortic disease are absent. Tuberculous root glands were present in all the cases. The tuberculous process was localized to the root glands and pericardium in ten. In six the lungs, pericardium and root glands were tuberculous. Terminal miliary tuberculosis occurred in twelve: in eight following primary root gland and pericardial tuberculosis and in four following primary lung, root gland and pericardial tuberculosis. Pleural effusions were present in fifteen cases, being bilateral in most; in eleven there was either an acute pleurisy or pleural adhesions. Chronic congestion of the liver was present in most with either fibrous, fatty or tuberculous changes. In spite of the short duration of the history, usually between three and six months, the authors believe that the condition is usually insidious in its onset and that these Bantu patients began to notice symptoms only when they became severe. A history typical of congestive cardiac failure was generally given, especially in cases of the effusion type. Usually there was complaint of cough. Hemoptysis occurred in five cases. Seventeen patients complained of abdominal pain, usually localized to the right hypochondrium, and eleven complained of chest pain, usually localized to the precordium. Edema of the legs was observed in eleven, breathlessness in eleven and loss of weight in eleven. The temperature was raised in twenty-two, the respiratory rate in twenty and the pulse rate in twenty-nine. A febrile chart, rapid pulse and breathlessness were found chiefly with pericardial effusions. Most of the patients were poorly nourished; fifteen had an emaciated appearance. Signs of pulmonary tuberculosis were present in only nine patients. The tuberculosis was of the primary clinical type of Riesman (1901). The liver was enlarged and tender in twelve, and eight had ascites. The effusion stage is the easiest one in which to make a clinical diagnosis; the enlarged pear-shaped area of cardiac dullness with an obtuse cardiohepatic angle is the main sign. Death usually occurred in from one to six months after the onset of symptoms. Pericardial aspiration and pneumopericardium improve the prognosis as far as the time of survival is concerned. This is substantiated by the fact that in the only patients who left the hospital the pericardium had been aspirated and in addition pneumopericardium was performed in one. The cause of death is either cardiac failure or, more commonly, miliary tuberculosis, which is common in tuberculous pericarditis. The probable entry of the organisms into the blood stream, particularly in cases in which there is intrapericardial caseation, is by the rupture of a tuberculous follicle into a vein.

Journal of Laryngology and Otology, London

55:269-302 (June) 1940

- *Tuberculosis of Larynx in Childhood. T. O. Howie.—p. 269.

Tuberculosis of Larynx in Childhood.—Howie looked for laryngeal lesions when examining 159 children, from 4 months to 16 years of age, suffering from pulmonary tuberculosis. Tubercle bacilli were present in the sputum or in the stomach

washings of ninety of these. Thirty-eight of the "open" cases presented tuberculous laryngeal lesions. Tuberculous laryngeal disease was present in only three cases with sputum or stomach contents negative for tubercle bacilli. It appeared that bovine and human infection is equally prone to produce laryngeal disease. Most of the lesions occur in open cases with cavitation and bronchopneumonic pulmonary lesions. Postmortem examination of specimens confirmed this observation. The youngest child to have tuberculosis of the larynx was an infant of 4 months. He died with multiple lesions in the mastoid, the kidney and the intestine. The lungs showed extensive bronchopneumonic disease. In the early stages of laryngeal involvement there is seldom any indication of its presence. The child makes no complaint of discomfort, pain or hoarseness unless the cords are destroyed or kept apart by the bulk of tissue during phonation. Even when the condition has advanced to the stage of perichondritis of the arytenoid or epiglottis there is no complaint of pain. Dysphagia was not encountered. The tuberculous laryngeal lesions conformed to those seen in adults, varying from a slight "streaking" of one cord to extensive destruction of the larynx, with perichondritis and fetid breath. The presence of some of these lesions was confirmed at necropsy. They were usually located in the posterior part of the larynx, in the interarytenoid area and on the posterior extremity of the cords. The disease usually began with a peaking in the interarytenoid area and was followed by destruction of one or both cords over the vocal process of the arytenoid. A few progressed to the stage of tuberculous papillomatosis. When a lesion developed during the interval of six weeks which elapses between examinations of all children, vocal rest and creosote inhalation have in many instances led to a resolution of the condition. The laryngeal condition runs parallel to the pulmonary condition. If the general condition becomes worse the laryngeal condition likewise gets worse. If marked improvement occurs in the former, as it often does after successful pneumothorax treatment, there is a tendency for the latter to be arrested and in some cases to resolve. Possible routes of infection are discussed. The author believes that the cases reported here provide evidence that laryngeal involvement is the result of direct implantation of tubercle bacilli in the tissues of the larynx.

Lancet, London

2:123-154 (Aug. 3) 1940

- Treatment of Gunshot Wounds of Peripheral Nerves. H. Cairns and J. Z. Young.—p. 123.
*Fibrin Suture of Peripheral Nerves: Measurement of Rate of Regeneration. J. Z. Young and P. B. Medawar.—p. 126.
*Nerve Regeneration: Importance of Peripheral Stump and Value of Nerve Grafts. J. Z. Young, W. Holmes and F. K. Sanders.—p. 128.
Small-Scale Filtration of Citrated Plasma. S. R. M. Bushby, G. A. H. Buttle and L. E. H. Whitby.—p. 131.
Postmortem Cesarean Section with a Living Child. Joyce Morgan.—p. 132.
Reduction of Dust-Borne Bacteria by Treating Floors. M. van den Ende, Dora Lush and D. G. f. Edward.—p. 133.
Head Tetanus: Case. E. C. B. Butler.—p. 134.
Koplik Spots in Colon. F. G. Hobson.—p. 134.

Fibrin Suture of Peripheral Nerves.—Young and Medawar present a method by which stumps can be held together with concentrated coagulated blood plasma. The method reduces the difficulties of nerve suture and minimizes the disorganization of fibers which is apt to be produced by stitches. It consists in holding the cut stumps together and pouring round them plasma which has been mixed with strong tissue-extract. In from one half to two minutes the plasma clots to a firm jelly which sticks to the nerves and holds the stumps together. The plasma is freely permeable and is dissolved away during the subsequent days, remaining, however, long enough to allow a firm union. The gel formed by ordinary plasma is not sufficiently strong to maintain union under tension, but it can be fortified by dissolving in it sufficient fibrinogen to increase its normal concentration. Cockerel plasma has proved more satisfactory than that of mammals. Blood is withdrawn from the carotid artery through oiled cannulas into large centrifuge tubes. These are packed in ice for ten minutes and then spun. The supernatant plasma is stored in waxed test tubes on ice and keeps for at least six weeks. The animal should be starved for thirty-six hours before. No heparin need be used. The concentration is effected by the precipitation of fibrinogen (with

prothrombin) from part of the plasma and by its re-solution in a smaller volume. The concentration thus concerns only the protein constituents. The method of salting out by half-saturation with sodium chloride is unsatisfactory, because the excess of salt interferes with clotting. Mellanby's method is used, one volume of plasma being mixed with nine volumes of redistilled water and then slowly with from 0.1 to 0.15 volume of a solution of acetic acid in redistilled water containing 1 per cent by volume. The fibrinogen forms a flocculate, which is centrifuged out after standing for five minutes. The supernatant fluid is discarded and replaced with water, which is also taken off with a fine pipet. The fibrinogen may now be either used directly or stored under distilled water at 4 C. It keeps for at least ten days. Before use the fibrinogen is dissolved in plasma—not in saline solution, because in the presence of serum the fibrin clot is stronger and much more stable. For use with rabbit nerves a six times normal concentration has proved satisfactory; that is, one produced by dissolving in one volume of plasma the fibrinogen precipitated from five volumes. The quick and even coagulation of the plasma is ensured by mixing it thoroughly just before application with not more than a tenth of its volume of a concentrated tissue-extract. Chicken-embryo extract in saline solution (2 cc. for a ten day embryo) is satisfactory. The plasma method has been found to give satisfactory junction of the cut sciatic nerve of the rabbit. Little or no plasma penetrates between the cut stumps, and no barrier to regeneration is presented. Microscopic study shows that the junctions made by the plasma method are readily crossed by nerve fibers. It is impossible in any nerve junction to ensure that all the fibers pass straight from the central to the peripheral stump, but in the fibrin junction there is a near approach to this condition, with none of the whorls and deviation of large bundles of fibers, which are unavoidable with stitching unless the epineurium alone is sutured—a difficult achievement with small nerves.

Nerve Regeneration.—Young and his associates point out that Cajal has established that recovery after section of a peripheral nerve depends on the outgrowth of new nerve fibers from the central stump but that there still remains some uncertainty about the contribution made by the peripheral stump. Knowledge regarding the peripheral stump is of importance in deciding on operation; e. g., the advisability of delay before suture, and the possibilities of nerve grafts. That the peripheral stump plays a part in making the junction is shown by experiments in which the nerves are cut and the stumps allowed to remain separate. Such operations have been done on rabbits. The rates of outgrowth observed from the central stumps vary from zero, in cases in which a bulb was formed, to a maximum of 0.4 mm. a day. The average rate of outgrowth was 0.2 mm. a day. This is much slower than the rate found for outgrowths from peripheral stumps, which send out strands at a rate of 0.45 mm. a day, and in some cases 1 mm. a day. The extent of these proliferations from peripheral stumps differs from animal to animal, and the authors have not been able to discover what variable factors are involved. It appears, however, that the Schwann cells grow best when they have some support, such as was provided by leaving a part of the sciatic nerve uncut. When the central and peripheral stumps are left close together with a gap less than about 2 cm., union between them may take place rapidly. The average rate for crossing such gaps was 0.77 mm. a day and the highest rate was 1.3 mm. a day. Though it is impossible to discover what proportion of the outgrowth comes from each of the stumps, there is reason to believe that the greater part comes from the peripheral end. The speed of outgrowth of Schwann cells from the peripheral stump suggests that there may be some accelerating and attracting influence exercised by the central stump on the Schwann tissue growing from the peripheral stump. There is no doubt that Schwann cells, growing mainly from the peripheral stump, can effectively bridge gaps between cut ends. The fact that outgrowth takes place so actively from a peripheral stump emphasizes the importance of the contribution made by the Schwann cells to regeneration, and proper appreciation of this is essential in considering the various types of graft for bridging defects. The difficulty in assessing the value of grafts is partly due to the fact that there has been no quantitative comparison. The authors made such a comparison

by measuring the distance reached by outgrowing fibers after the insertion of grafts of various sorts into the peroneal nerve of the rabbit. The grafts were always pieces of rabbit tibial nerve 2 cm. long and were fixed in place under aseptic conditions with concentrated fibrinogen solutions. After from fifteen to twenty-five days the animal was anesthetized and the length of outgrowth determined by pinching the nerve from a distal point upward until a reflex response was obtained. Grafts of different sorts were placed on opposite sides of each rabbit. The authors made experiments with autografts, predegenerated autografts, homografts, stored homografts and alcohol-fixed homografts. It was found that a fresh autograft provides for the growth of new fibers a medium which is only slightly less satisfactory than a normal peripheral stump. Since it seems that successful regeneration depends on the active contribution of the living Schwann cells of the peripheral stump, it is essential that the graft be treated as a living thing and not pinched with forceps, dried or otherwise maltreated. Fresh autografts provide the most successful results, and predegeneration does not seem worth while. The success of the thin Ballance-Duel grafts suggests that small nerves may make better grafts than large nerves, and a cable graft of several thin strands is probably better than a single thick graft.

Medical Journal of Australia, Sydney

1:885-914 (June 29) 1940

Cerebral Compression: Clinical and Experimental Study. W. L. Reid.—p. 885.

Studies in Tuberculosis: VI. By Effects of Purified Protein Derivative of Tuberculin as Used for Mantoux Test. D. Anderson.—p. 893.

Cryptophthalmos or Ablepharia: Survey of Condition with Review of Literature and Presentation of Case. I. Brodsky and G. Waddy.—p. 894.

2:1-28 (July 6) 1940

Spinal Analgesia. A. D. Morgan.—p. 1.

Snake Bite in Practice. H. Flecker.—p. 8.

Technic of Intracutaneous Tuberculin Test. D. Anderson.—p. 13.

2:29-50 (July 13) 1940

Some Acute Virus Diseases of Respiratory System. E. W. Hurst.—p. 29.

Orthopedics and the Great War. L. O. Betts.—p. 35.

2:51-76 (July 20) 1940

Cerebrospinal Meningitis. W. L. Calov.—p. 51.

Practitioner, London

145:85-148 (Aug.) 1940

Prevention of Acute Specific Fevers. J. C. G. Ledingham.—p. 85.

Prevention of Pulmonary Tuberculosis. R. C. Wingfield.—p. 92.

Prevention of Mental Illness. R. G. Gordon.—p. 99.

Prevention of Dietary-Deficiency Diseases. L. J. Harris.—p. 105.

Prevention of Venereal Disease. R. Lees.—p. 119.

Treatment of Wartime Neuroses in Combatants. E. Bramwell.—p. 124.

Modern Therapeutics: XIV. Antipyretics. V. J. Woolley.—p. 132.

Tubercle, London

21:249-280 (May) 1940

Position of Transverse Interlobar Fissure of Lung in Relation to Prognosis in Pulmonary Tuberculosis. B. H. Y. T'Ang and C.-L. Hsu.—p. 249.

Pathogenesis of Tuberculosis of Peripheral Lymph Nodes: Clinical Study of 324 Cases. B. C. Thompson.—p. 260.

Chinese Medical Journal, Peiping

57:401-500 (May) 1940

Tuberose Sclerosis of Brain (Bourneville) and Adenoma Sebaceum of Face (Pringle) in a Chinese. I. Snapper.—p. 401.

Studies on Stability of Suspension for Agglutination of *Corynebacterium Diphtheriae*. C. H. Huang and R. H. P. Sia.—p. 418.

Pellagra Among War Refugees in Shanghai: Its Associated Deficiencies and Nicotinic Acid Treatment. H. H. Morris, M. S. Hwang and P. T. Kuo.—p. 427.

Notes on Kala-Azar Research in China: Part II. Use of "Distibinal" in Treatment of Chinese Kala-Azar. C. J. Sun and S. Chang.—p. 442.

Dyspnea: Lecture in Applied Physiology. H. S. D. Garven.—p. 449.

Survey of Intestinal Parasites in Rural Szechwan. T. H. Williams.—p. 464.

Infectious Mononucleosis: Report of Case. J. B. Robinson.—p. 473.

Congenital Dislocation of Radius. C. M. Meng.—p. 479.

Treatment of Fracture of Patella by Excision. H. C. Chih.—p. 482.

Nonmetrical Study of Bony Nose of the Chinese. C. S. Lu.—p. 485.

Brasil-Medico, Rio de Janeiro

54:379-392 (June 1) 1940. Partial Index

- *Influence of Heredity in Allergic Disease: Study of Familial Incidence in 350 Allergic Persons. A. de Oliveira Lima.—p. 379.
Practical Classification of Convulsions. J. Barbosa.—p. 383.

Heredity in Allergic Diseases.—De Oliveira Lima discusses the role of heredity in the development of allergic diseases and reports his observations on familial incidence in 350 cases of allergy in persons of either sex. There was a history of allergy in the parents or relatives of the patients in 289 cases. It was found lacking in sixty-one persons who were classified as patients with specific hypersensitivity not related to heredity. The author found that hereditary allergy may be transmitted by the two or either parent in the same ratio of incidence regardless of the sex of the transmissor parent. The first symptoms of allergic disease develop before puberty in persons with bilateral allergy from both parents and after puberty in those with unilateral allergy from either parent, as well as in those with allergy from specific hypersensitivity not related to heredity. In the group of cases reported by the author genotypic predominated over phenotypic heredity. There was bronchial asthma in 100 cases, migraine in twenty-eight, chronic rhinitis in 180, urticaria in twenty, atopic eczema in thirty-two and allergic disturbances of the digestive tract in twenty cases. Evidence of hereditary transmission of an organ of shock was found in none of the cases. Some persons with a history of bilateral or unilateral allergy in the ancestry had prepuberal allergic children. Allergy in these cases followed the same behavior as that of the condition in adults. None of the persons with specific hypersensitivity not related to heredity had children with allergy. The children in this special group were young and far from the prepuberal age.

Sovetskaya Meditsina, Moscow

Pp. 1-48 (No. 11) 1940. Partial Index

- Oxygen Therapy in Tuberculous and Nontuberculous Pulmonary Disease. V. L. Eynis.—p. 3.
So-Called Idiopathic Pleuritis. V. A. Ravich-Tscherbo.—p. 6.
Newer Therapeutic Methods in Tuberculosis of Upper Respiratory Tract and Mouth. A. N. Voznesenskiy.—p. 10.
Value of Tuberculin Tests in Children. V. D. Markuzon.—p. 13.
Mediastinal Emphysema as Complication of Traumatic Pneumothorax. A. K. Kox.—p. 14.
Active Forms of Tuberculosis. I. I. Ludvinovskiy.—p. 16.
The Jacobaeus Operation in Treatment of Pulmonary Tuberculosis. P. N. Altshuler.—p. 18.
*Treatment of Pulmonary Abscess with Alcohol Enemas. S. I. Mazel.—p. 12.

Alcohol Enemas for Pulmonary Abscess.—The good results obtained in the treatment of acute and subacute pulmonary abscesses with intravenous injections of from 20 to 30 cc. of a 10 per cent solution of alcohol in physiologic solution of sodium chloride suggested to Mazel the rationale of administering it by the rectal route. He believed that the alcohol would be absorbed by the inferior hemorrhoidal vein and thus gain direct access to the pulmonary circulation without passing through the liver. The alcohol exerts a bactericidal effect on the early suppurative focus in the lung, stimulates the reticulo-endothelial tissue to the formation of antibodies and assists in obliteration of the formed cavity. The method consisted of a daily preliminary cleansing enema followed in from two to three hours by introduction into the rectum of from 60 to 75 cc. of 10 per cent alcohol in physiologic solution of sodium chloride. The average duration of treatment was from thirty to thirty-five days. After some twenty enemas the temperature, as a rule, fell, the sputum diminished in amount and lost its offensive odor, elastic fibers were no longer present and the general state improved. With further therapy, infiltration and cavities disappeared in roentgenograms. The author reports the results in twenty-nine cases treated since 1937. The duration of the process in twenty-five was from two weeks to five months, and in four from eight to twelve months. Ten patients were cured, eleven much improved, four improved, in two no results were obtained and two died. The author concludes that the rectal method is as effective as the intravenous. The method is most effective in the stage of suppurative infiltration before the formation of a cavity. It is effective in the acute and subacute stage but is of no value in the chronic stage.

Nordisk Medicin, Gothenburg

6:1119-1170 (June 29) 1940

Hospitalstidende

- *New Electro-Encephalographic Rhythm in Epilepsy. T. Dalsgaard-Nielsen.—p. 1119.
*Investigations on Vegetative Function in Posttraumatic Dystrophia of Extremities. H. Haldbo.—p. 1124.
Case of Obliteration of Mesenteric Blood Vessel. A. Birch-Jensen.—p. 1128.

Electro-Encephalographic Rhythm in Epilepsy.—Dalsgaard-Nielsen reports three cases of symptomatic epilepsy with a peculiar "1 Hertz rhythm" not previously described, which is characterized by (1) regularity, (2) low frequency: "1 Hertz rhythm," (3) low potential, about like that of a normal fronto-occipital Berger rhythm, (4) typical form, with even slow rise and abrupt fall and (5) derivation from a single focus. In the first case there was evidence of cerebral atrophy at the site of the lead, but the history did not suggest traumatic origin. In the second a traumatic etiology seemed possible and there were clinical signs of pathologic changes in the brain at the site of the lead. In the last case, with certain traumatic origin, ventriculography and operation confirmed the presence of a traumatic brain process at the site of the derivation. The author gives warning that there may be sources of error, and furthermore that this rhythm may originate as a pulsation phenomenon, and says that evaluation of the nature and diagnostic importance of the "1 Hertz rhythm" must await the results derived from further examinations.

Vegetative Function in Posttraumatic Dystrophia of Extremities.—Haldbo's examinations in about fifty cases of posttraumatic dystrophy of the extremities, recent distortions and contusions, also some inflammations, showed vasomotor disturbances and disturbances in the secretion of sweat in all cases. He states that as a rule the disturbances disappeared in from two weeks to two months but that they persisted in cases in which haliteresis, edema and cutaneous changes occurred, and anhidrotic parts may extend and gradually occupy an entire extremity. He stresses the practical value of the perspiration test in the surgical clinic as a simple method which allows vegetative disturbances to be followed and timely treatment to be instituted.

Hygiea

- *Sulcus Superior Tumors. C. G. Ahlström.—p. 1129.
Disturbances in Albumin Content of Blood. H. Malmros.—p. 1134.
Clinical Value of Galactose Test in Hepatic Disorders. T. Hafström.—p. 1137.

Superior Sulcus Tumors.—Ahlström's first patient, a man aged 36 with increasing radiating pain in the upper thorax for about half a year, was shown by x-ray examination to have a shadow in the apex of the right thoracic cavity, together with partial destruction of the second and third ribs and corresponding processes on the right side. Shortly before death complete paralysis of the lower extremities occurred. Necropsy disclosed a tumor belonging to the chest wall, with subapical localization and only slight marginal infiltration of the lung, destruction of the posterior parts of the second, third and fourth ribs and invasion of the spinal column and compression of the spinal cord. Microscopically the tumor was an endothelioma of the pleura. The second patient, a woman aged 60 with increasing pain and numbness in the left arm for several months, had an apical shadow in the roentgenogram extending to the left hilar region, with atrophy and destruction of the upper ribs on the left side. Necropsy showed a scirrhus tumor, corresponding in structure to that in the first case, in the left thoracic inlet, extensive infiltration of the surrounding tissue, destruction of the upper ribs and dislocation of the apex of the left lung by the tumor, which was intimately attached to the pleura and had only slightly invaded the apex. The author says that the term "sulcus superior tumors" is a collective designation for neoplasms which occur in a certain area of the thoracic inlet and that in practice two kinds of these tumors are to be reckoned with, namely apical lung tumors, which make up the majority of sulcus superior tumors, and tumors of the cupola, which are mainly endotheliomas of the pleura.

THE STUDENT SECTION

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At the Dawn of Modern Youth in Medicine

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LOS ANGELES

The recent graduate in medicine has arrived at an important period in his career without much thought perhaps of how so many apparent obstacles to his progress could have been devised, and why the exacting program in which he has been engaged should be necessary. On reflection, however, it is obvious that obstacles have not been hastily erected nor has the educational program which he has completed been other than constructively arranged. In the evolution of medical education this has occurred in an orderly fashion.

Medical education in this country began in 1765 with the organization of the College of the Philadelphia Department of Medicine, which in 1791 became the University of Pennsylvania Department of Medicine and in 1909 assumed its present title of the University of Pennsylvania School of Medicine. In 1768 this school granted the first medical diploma issued in America. Since the beginning of medical education in America, about 460 medical schools have been chartered in this country and Canada; today there are only eighty-seven approved medical schools in the United States and Canada. In other words, in 140 years about 370 medical schools have come and gone, for there were but five schools in 1800. Medical education in the United States today is regulated by rules and specifications of the American Medical Association, together with those of the Association of American Medical Colleges and by the requirements of the various states for licensure to practice.

In order that one may understand the reason for rules and definite regulations in medical education, it may be stated that the nineteenth century witnessed the organization of many schools for instruction in medicine which were frank commercial enterprises in design and purpose. The general level of practice of the recipients of certification in medicine by many of these schools was low and the tendency was downward. Early in the last

century less than 10 per cent of the physicians in this country were graduates of medical schools and more than 80 per cent had not attended lectures in a school of medicine. The need for improvement in methods and the elevation of medical education was apparent as early as 1827. In that year delegates from the medical schools and various societies convened and formulated certain recommendations regarding the length of the medical course, and they suggested that Latin and natural philosophy be required preliminary to the study of medicine. The first national medical convention in the United States was held in 1846 for the purpose of advancing the standards of medical education. At the convention the following year the name of the American Medical Association was adopted.

Even though many other agencies have been cooperative and influential in the advancement of medical education, it has been the object of the American Medical Association throughout the years to promote the science and art of medicine as well as the betterment of the public health, and it has pursued with diligence the self-imposed task of elevating medical education. The effectiveness of rules and specifications for medical education as they have been developed and amplified from time to time may be attested by the failure of so many schools to meet the standards for approval. Consequently such schools soon ceased to exist. It is of interest that today relatively few schools approved by the American Medical Association retain their approval through fulfillment of only the minimum requirements. As a matter of fact, most of the approved medical schools of today are strong medical departments of universities with high educational standards.

As medical education has improved during the years, so has the standard of education preliminary to the study of medicine been elevated. In the educational number of THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION dated Aug. 26, 1939, it may be noted that a baccalaureate degree is required preliminary to admission to five medical schools in the United

Read before the annual meeting of the staff of the Alameda County Hospital, Oakland, Calif., June 6, 1940, on the occasion of presenting certificates to interns and residents of the hospital.

States, that 60 per cent of the medical schools require three years of college work and that only eleven medical schools accept the minimum requirement of two years of preliminary education which is acceptable to the Council. That the standards of preliminary education have been elevated materially is indicated by data from the Council on Medical Education and Hospitals of the American Medical Association, which discloses the interesting fact that in 1910 only 15.3 per cent of the graduates of medical schools in the United States held baccalaureate degrees whereas, in 1932, 71.4 per cent of the graduates held the degree of either A.B. or B.S. A decline to 66.5 per cent of graduates from the seventy-seven approved medical schools in the United States in possession of a baccalaureate degree has occurred since July 1, 1938.

THE PHYSICIAN AN EDUCATED PERSON

I speak of these matters for the purpose of emphasizing that men and women of medicine today are educated persons. They are educated not only in medicine but in the arts and sciences as well. This is in no wise intended as disparaging to those who have preceded us, for it was not their privilege to enjoy and profit from the great educational facilities of today. The stature of many of those of the past was such that they attained memorable and undying distinction in their achievements without the insignia of one of letters, and unlimited tribute is due those of that earlier period who through their earnestness, integrity and splendid personal characteristics were able to maintain the profession on so high a plane with a foundation so unstable, and to hand down to those who followed a legacy to which they contributed so much more than they had received.

Medicine has advanced so rapidly during the past twenty-five years or thereabouts that the curriculum of the medical school has by virtue of necessity undergone great change. Some years ago an opportunity was provided to obtain under supervision at least some practical experience during the clinical years. The crowding of the curriculum with the requirements of the medical education of today has largely eliminated that opportunity. Practical experience can be obtained now only through internship, residency and what constitutes organized postgraduate training. The University of Minnesota was the first to make practical rectification of this situation in medical education and since 1915 it has exacted a year's internship requisite to the degree of Doctor of Medicine. Thirteen medical schools in the United States and Canada now require the internship for the degree of Doctor of Medicine. One of these, Duke University, requires two years' internship, even though the M.D. degree is granted after completion of the senior year.

Twenty-two states, the District of Columbia, Alaska and Puerto Rico require hospital internship of all applicants for licensure.

It may seem to those who are unfamiliar with the past, and to those who are not cognizant and aware of the magnitude of the science of medicine, that the program of education and training imposed on the aspirant to fellowship in the medical profession is unduly burdensome in educational attainments required, in time consumed and in energy expended. It should be stated that the magnitude of the science of medicine is unlimited, in medicine one consumes all time, medicine commands one's entire effort and energy, and educational attainments of the highest order are essential for even a modest comprehension of all that medicine involves. Medicine is a chosen profession but a profession which accepts only those who are physically, mentally and morally qualified not only to endure its prerequisites but to challenge and engage the problems and responsibilities of its sphere. Medicine likewise rejects those who have ambition without cause.

The recent graduate in medicine has had but one educational highway along which he could proceed with others to attain his present station. There now lies before him a maze of routes diverging from that which he has just traversed and undoubtedly he has experienced some bewilderment in the selection of his future course and has wondered what his ultimate destination in medicine may be. It is during one's youth in medicine that one's individual traits, inherent aptitude, talents, capabilities, natural tendencies and physical, mental and moral characteristics as they have been influenced by what has preceded will take form and mold one as a distinctive individual in medicine. One will proceed in medicine as one has been molded. Fortunate indeed are those who through predilection have chosen a future course, leaving them unencumbered by indecision to pursue their objectives. Indecision and uncertainty on the part of the recent graduate should not be disconcerting, and that an open highway to his own desirable objective, equipped with a conveyance assuring him of easy and comfortable passage, is not immediately visible and available to him should not serve to discourage. Instead, one should be mindful that Pasteur, Lister and others were among the many whose achievements have been notable, epoch making, revolutionary and not infrequently subjected to bitter challenge and that they hewed and hacked their own road through virgin forest. One may say that this was long ago and can no longer occur. The reply is that new roads and by-ways are being driven into the unknown of medicine today and that the achievements in the advancement of medical science of today will be ranked with

those of the past by the future historian. A multitude of opportunities continue to exist in medicine for those of discernment, initiative and the will to do.

POSTGRADUATE TRAINING AND EXPERIENCE

The graduate in medicine today is a sound product of modern education and is better prepared fundamentally in all phases of medicine than were his predecessors to engage the problems and responsibilities; yet, inconsistent as it may seem, the door to the field of active practice has not been flung wide but stands ajar to those who may with courage but without wisdom venture forth. This reflects not on the educational program that the graduate has just completed but is due to the demands of modern practice. Pasteur said "Chance favors the prepared mind." Another has said "The prepared mind is a mind stored with the history and fruits of human experience. It is a mind which has been called upon in the course of its education to deal with problems, now of one kind, now of another. It is a mind fitted to enjoy and to be guided by the spiritual experiences of the human race." An intellectual preparation of the mind occurs while one is engaged and occupied in a formal educational program or curriculum. Maturity of mind occurs only through experience in the subsequent formal and informal activities of human endeavor. Herein lies the necessity for and the value of adequate postgraduate training and experience. The question of what constitutes adequate postgraduate training and experience is immediately in order, and it cannot be answered in a dogmatic fashion or without deliberation.

A period of more or less formal and organized study in hospitals and clinics immediately following the completion of the medical curriculum is the order of the day. The length of time which can be spent in such postgraduate study and supervised experience varies from a minimum of one year's internship to a carefully organized progressive program of approximately seven years in a few institutions, wherein unusual facilities for such training exist or have been organized, with from three to five years constituting the period in many institutions. As to just what type of postgraduate training one may engage in following the internship and where the desired training may be obtained constitutes a problem the solution of which is often extremely difficult. Irrespective of what branch of medicine one wishes to make one's life work, it is generally agreed that the broad foundation gained from a rotating internship provides the most stable footing from which one may progress. One's own inherent talent in a certain direction is perhaps the most important influence. One should aspire to employ one's time and energies in the direction of that phase of medicine to which one has been

attracted and in which one has demonstrated to oneself and to others that one possesses talent. There are many in medicine who have not chosen their sphere wisely, who through inherent deficiencies requisite to the pursuit of certain branches of medicine are totally unfit, but who in another field of medicine might proceed with credit and even bring luster to their names and to the medical profession as well.

Fortunate indeed is he who either during his student days or while engaged in his internship has recognized that within himself there are certain attributes which qualify him peculiarly and particularly in a special branch of medicine. And fortunate indeed is he who during this period has come under the influence of an inspirational preceptor who has recognized a dormant or latent talent and has sparked the mechanism which propels the youth to otherwise unattainable heights in medicine. The necessity for the firing of ambition in medicine is great, and that fire must continue to burn in order that one may progress. This is spoken without reference to any particular branch of medicine. Fire is as essential to general practice as it is to any of the specialties. Work is the center of the circumference of one's life in medicine, and only through the ambitious pursuit of one's work can one continue to enjoy the routine tasks and smile at disappointment. It should be emphasized that, irrespective of the branch of medicine that one wishes to pursue, there are many routine tasks and as many disappointments. It is essential that one develop a philosophy good for all weathers.

GENERAL PRACTICE AND THE SPECIALTIES

Those who choose to engage in general practice must of necessity sacrifice depth of knowledge in favor of breadth. Herrick has said "To the brilliant mind of half a century ago a working knowledge of all the departments of medicine was attainable; today such a progeny is impossible." The field of general practice is broad, but through specialization depth of knowledge has been made available in accordance with modern practice. Specialization in the various fields of medicine provides for proficiency when proper correlation of the specialties and of the specialist exists but inadequately serves when carried to organs or systems of organs with narrowing of vision and loss of the perspective of the organism as a whole.

Those who have chosen to engage in general practice are legally qualified to do so, and their moral qualifications will exhibit themselves as they refrain from attempting the use of methods and the performance of technical procedures in which they have not been trained. Those who aspire to proficiency in a special field of medicine need not sacrifice breadth of medical

knowledge but must attune themselves to the depths of the special field and to the time and energy requisite to the attainment of recognized proficiency. To speak specifically in medicine it is not enough that one know when and how much insulin shall be administered to the diabetic patient; one must know all that is known about the disease, its allied metabolic disturbances and the basic therapeutic principles. It is not enough that one know that the administration of vitamin K and bile salts serves as a specific in the control of the hemorrhagic tendency in obstructive jaundice and in certain other prothrombin deficiency states. It is not enough that one know much of the present in medicine and little of its past. It is not enough if one does not now know or if one does not learn as one progresses the processes through which medicine had advanced. No cursory survey of a subject or of a field of medicine today qualifies one as outstandingly proficient in that branch. There is no short road or circuitous route by which one can arrive at proficiency in any of the specialties of medicine. This is particularly true of surgery and its allied specialties. It is true that the degree of proficiency attained by those who pursue a prolonged period of formal training in surgery is a variable one. Proficiency in surgery depends on many factors. I cannot define them all. The surgeon may become mature but he is never a finished product. To progress he must grow, and to increase his surgical stature requires physical, mental and moral sustenance. *Surgery commands certain attributes which fundamentally are inherent, and without these the seeds of training fall on infertile soil.* One is not born a surgeon, but a surgeon is born with certain inherent qualities which influence those that may be acquired. Postgraduate training may enable one to execute surgical procedures skilfully and under supervision exhibit a tendency to stay a courageous hand, but something more is essential to the proper direction of the mind and the hand of the surgeon. The moral ingredient of man provides the foundation for the rearing of judgment which must guide the surgeon in the utilization of his knowledge and the application of his skill.

To those who aspire to proficiency in surgery or in one of its allied fields I should like to appraise the depths. As no one untrained can successfully explore the depths of the sea, so can no one venture without adequate postgraduate training, and the resultant armamentarium, into the field of surgery with hope to achieve. To define adequate postgraduate training in surgery is not dogmatically possible. However, certain minimum standards have been erected by the American College of Surgeons and by the various American boards for certification of the specialist by which his status may

be recognized. This is all in entire conformity with the ideals of medicine to leave it better than when it was found.

CHALLENGE TO PROGRESS

As one proceeds through life in medicine one will find it of advantage to maintain a progressive spirit, and to progress one cannot with aristocratic detachment go his own way. The fellowship that one can enjoy with his colleagues in medicine provides the stimulation so constantly necessary in an exacting profession. One will find as one proceeds day by day and from one year to another that one's progress is constantly subject to formal, informal, visible and invisible challenge. No two words express so eloquently the significance of that daily challenge in medicine as do those comprising the title of Lloyd Douglas's recent book "Disputed Passage." You at this time have in common with your faculty members and your preceptors only one distinction, possession of the degree of Doctor of Medicine. As to whether you will adorn that distinction depends not only on the height but on the manner of your achievements.

I would repeat that the man of medicine today is an educated man. He is educated not only in medicine but in the arts and sciences as well. It is expected of him, and not unjustly so, that his thoughts, his spoken words and his conduct shall at all times and under all circumstances reflect with honor and distinction on his own inherent capacity, opportunity and privilege to attain the high educational status that qualifies him to receive at the hands of those who are authorized to bestow them the insignia by which he may be recognized as an educated man and a doctor of medicine. The man of medicine who utilizes his premedical education in the arts and sciences not as a springboard to the medical curriculum but as the foundation for the building of a broad culture wherein the spiritual phase of medicine arranges a perspective through which ideals can be appreciated will find happiness and success by his own measure of achievement.

It is my hope as you engage the problems and responsibilities of your chosen profession that you will at all times and under all circumstances perform your professional duties with compassion, unselfishness and honor; that in your work you will always find happiness but will never be entirely content with your progress; that when you have completed your life's work your contributions, humble as they may be, will have served to make the profession of medicine better than one finds it today. It is my wish to leave with you the words of Albert Pike, who said "What we have done for ourselves dies with us, what we have done for others and the world remains and is immortal."

561 Roosevelt Building.

Digests and Reviews

TO THOSE ENTERING THE MEDICAL WARDS

By Dr. A. H. Douthwaite. Slightly abridged from *Guy's Hospital Gazette*, Oct. 22, 1938.

The physical transition from medical school to the wards is of small moment; it is the complete change in the character of work, the acceptance of actual responsibility for sick people and, more than all, the observance of their mental reactions which mark this as an epoch of considerable significance. Those of you who come to us from other schools may be struck by the absence of formality which exists at Guy's. Though subjected to criticism from some quarters, it is, I believe, a desirable feature inseparably linked with the policy of producing men trained to be practical rather than those nurtured on compulsory lectures now rendered an anachronism by a superfluity of textbooks. Rather do we invite you to accompany your teachers in the wards, see the problems for yourselves, ask questions when you will, and argue if you wish. Perhaps you have had mediocre success in the medical school and this has led you to doubt your ability to clear the last fences. Banish the fear. The best clinicians often emerge from such unpromising beginnings.

The next few years will be hard; the days of long holidays are over, for a fortnight out of an appointment is the maximum which can be taken lest valuable experience be sacrificed. The curtailment of time for relaxation is fortunately well compensated for by an infinite variety of enthralling experience.

As to the planning of your studies, accept the fact that last-minute cramming for final examinations is of no use. The subject is too vast for any than gradual absorption, so it is well to follow some plan from the outset. The preliminary clinical period prepares you thoroughly for the routine examination of patients and thus prevents waste of time when you enter the wards. Beds and their human contents are allotted to you, and therewith your share of responsibility. The taking of the medical history is the most important step toward arriving at diagnosis. This is primarily your job and its value cannot be overemphasized, though too often forgotten in a desire to search for physical signs of disease. The ability to sift the relevant facts from matter which obscures can come only with experience. In the meantime bear in mind the value of facts, as opposed to patients' interpretation of them, and of their presentation in a legible and, where possible, schematic form. When writing a report, do so with the thought that on its accuracy may depend the outcome of valuable

research undertaken years later. Whenever possible, examine your patient before he is seen by the registrar and commit yourself to a diagnosis. Progress of the disease, ultimate outcome, treatment given, opinions expressed on diagnosis, should all be entered to make the records of lasting value. Forms are now issued on which you can write down your observations and conclusions, and this should invariably be done. It is the only way to avoid that type of mental dishonesty which leads to brilliant differential diagnoses any one of which can be claimed as a personal success at a later date! This dangerous habit once acquired is difficult to discard. It meets with but scant respect, however, from the relatives of the sick. Mistakes have a high educative value. They snatch one with a jerk from the danger of self complacency.

Probably the best plan of study is to concentrate for the first three months on pathology. This entails, of course, frequent visits to the postmortem room. Given this grounding, symptoms and signs become the natural expression of the disease and their memorizing is unnecessary. Probably the most valuable time of the day for the acquirement of practical knowledge is that which follows the afternoon round. It is then that the house physician performs lumbar punctures, collects blood, taps chests and so on. These procedures should be watched and from time to time you will be given the opportunity of carrying them out yourself. It is now also that special signs referred to in the teaching round can be reexamined and thus fixed in the memory. It should be made a point of pride that within a fortnight you should be able to inspect the optic disks of any patient you may choose. Once the knack has been acquired, and it usually comes quite suddenly after several days of disappointment, it will never be lost. It takes many months to be certain of the normal as opposed to the diseased disk, yet recognition of early change may be of the utmost importance in determining a diagnosis and possibly even in saving a life.

The patients in your beds will confide in you possibly more than in the house officers or staff. To them you are their doctor and from you they will try to get confirmation of their fears in respect of illness, or of suspicions in relation to earlier treatment. An immense amount of mischief is caused by the making of unguarded remarks which can be misconstrued. Their avoidance is doubly difficult in a teaching hospital, where a discussion on the problem is too often carried out within earshot of the patients. We all err unwittingly in this respect, and the

importance of discretion needs reiterating. The fact that a patient can inspect his own report is deplorable and should be remedied.

Attend outpatients when you can. This is the only hospital activity which remotely approaches the conditions which obtain in general practice. The frequent absence of physical signs may be tedious, but precisely for this reason is the experience invaluable in forcing you to rely more and more on history taking. It is an antidote to the poison of mechanized medicine, the virulence of which increases with every new instrumental aid to diagnosis.

Don't live near the hospital until you have to. Knowledge is not in the air; disease is.

Go away for week ends.

Take holidays, abroad if possible, and with anybody who is not a medical student or a doctor.

Be active in the debating society. The ability to stand on one's legs and talk is acquired painfully by many of us. Its value is inestimable.

Insure your life and health, and join a society for protection against possible legal proceedings as soon as you are qualified.

In moments of despondency remember that medicine is the only profession which never provides two days which are alike and in which boredom is a rarity.

THE BROADENING HORIZONS OF MEDICINE

Condensation of an article by Dr. Winfred Overholser, read at the opening session of George Washington University School of Medicine, Washington, D. C., Sept. 25, 1939, and published in Science, Oct 20, 1939.

Many of those present today are taking their first steps along the road which leads to the practice of medicine. The road is difficult. Even those who are present today for the first time have already spent two years or more in college studying premedical subjects. They must spend four years of study in the medical school, after which there will come a period of internship. I am bold enough to question the wisdom of some of the required premedical work. There is a tendency today to require specialism altogether too early and to leave out of the equipment of the medical man what were known in the old days as the humanities. Although medicine has developed almost unbelievably, there are still other things which make life worth living and to which the medical man should not be inattentive. Let us hope that the day is not gone forever when medicine can produce such *littérateurs* as Oliver Wendell Holmes, S. Weir Mitchell, Sir William Osler and Harvey Cushing. I recommend as a decided contribution to a balanced mind the development of hobbies to which one can occasionally flee from the practice of medicine.

ATTRIBUTES OF A PHYSICIAN

In the midst of a cynical world it is well to reaffirm one's faith in such a thing as altruism, the desire to serve one's fellow men. I may be pardoned a quotation by referring to the tribute paid to the physician by Robert Louis Stevenson. The physician, as a rule, he comments, stands above the common herd, shares as little as any in the defects of a period and most notably exhibits the virtues of the race; he says of the physician: Generosity he has, such as is possible to those who practice an art, never to those who drive a trade; discretion tested by a hundred secrets; tact tried in a thousand embarrassments; and, what are more important, Heracleian cheerfulness and courage. So it is that he brings air and cheer into the sickroom and often enough, though not as often as he wishes, brings healing.

RELATION OF PHYSICIAN TO PATIENT

It is well to give heed to what is meant by a learned profession as distinguished from a trade or business. The professional man is guided by the ideals of his profession, rules of conduct which have been handed down and which are embodied for the medical man in the Hippocratic Oath. He is primarily a learned man who depends on his knowledge as his stock in trade. He has specialized knowledge over and above that of the common man in relation to some particular topic. Perhaps the thing that distinguishes him more than anything else is the peculiarly personal relation to the client or patient which he enjoys, a confidential relationship, a situation in which he is adviser, guide and friend, a situation in which his interest does not cease when the particular transaction is concluded. He is an individualist, one who functions far more efficiently without regimentation or coercion, but rather requires the opportunity to utilize freely his own initiative and judgment within the limits of his professional code of ethics.

He has an interest in the results of this relationship in which he is called to advise, which is over and above the cash recompense which he receives; in fact, in the practice of medicine it is all too often the case that no monetary recompense is received at all, and more frequently the recompense is wholly inadequate to the value of the services rendered. The physician does not consider that he is receiving a *quid pro quo* when he is paid by his patient. He is entitled to a living, but more than that he takes a satisfaction in seeing that the results of his advice have brought aid and comfort to the person who sought it.

Another feature is the disregard of fixed hours, the readiness to be of service whenever called on. He does not count on regular hours. He realizes when he takes up the study of medicine that his sleep will often be interrupted,

that his time will not really be his own, and he rejoices to feel that he may be called on when others are in need regardless of his own comfort. One other point of distinction is the principle as laid down in the Hippocratic Oath that he will teach this art to others, if they wish to learn it, "without fee or stipulation." Such are some of the distinctions which set off the learned professions, and particularly the profession of medicine, from business.

WILLIAM ALANSON WHITE

We have been deeply touched this morning by the presentation of the oil portrait of Dr. William Alanson White, the gift of the faculty to the school. I look on Dr. White as the ideal medical man. He was a student; he always wished to learn. He was a teacher, always happy in imparting his knowledge to others, a gift which he had in rare measure. He was deeply interested in the patient and desired first to understand the nature of the disorder. Whether or not he brought healing, he always brought comfort. At the same time he remained a human being, a man in close touch with his fellow men, a man of wide and scholarly interests.

A CENTURY OF PROGRESS

The significant advances in medicine in the last century are too many to be enumerated here. Consider the advances of bacteriology, the significant work of Morton, Lister and Pasteur, and more recently of Banting and his development of insulin, the work of Theobald Smith and McKinley in bacteriology, the work of Folin in chemistry and of Cannon in physiology, the development of the knowledge of the vitamins and of the endocrine glands, and of surgery. Perhaps even more important is the aspect of preventive medicine for which Walter Reed did so much. Today diphtheria, typhoid and many other diseases are virtually unknown. New horizons are being discovered daily in the field of allergy.

Let us not be deceived into thinking that human improvement is nearly ended. There is ample room for improvement. Much more is to be learned concerning the possibilities in the field of heredity and constitution, and in bacteriology with particular reference to the virus diseases and the development of biologic tests. Chemotherapy is only beginning. Surgery is on the threshold of new developments. The newer anesthetics in the field of obstetrics have revolutionized the practice of that specialty within the past few years. There is one field, however, on which medicine has hardly yet begun—medicine is just discovering man! So much in the past has been devoted to the parts of man, to his various organs, systems and specific functions that too little has been thought about man himself, the social animal whose principal significance is his relations with other

men. Dr. William A. White probably did more than any other medical man in this country to emphasize the importance of the individual, the "organism-as-a-whole," as he called it, a something which is greater and more important than the sum of all its parts, and indeed something different from the sum of its parts. He emphasized the fact, now just beginning to be recognized generally, that the influences which impinge on one from the outside, as well as the conflicts which arise from one's unconscious, have much to do with the physical functioning of the organism. So much attention was focused on the gastrointestinal and circulatory tract that it was forgotten that they were parts of an individual who was perhaps expressing in this particular way and by these particular symptoms his emotional conflicts. The field of psychosomatic medicine is in its infancy. It is encouraging to note recently in *THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* moderately frequent references to the psychic factors in disease. A tremendous expansion in the psychiatric approach to medicine may be looked for, and in this field we shall be constantly indebted to the contributions of Dr. White.

Even though the world is troubled, we may look for peace and satisfaction in the field of medicine, which is only at the beginning of possibilities of service and benefit to mankind. That medicine will continue as a profession in the hands of men possessed of individual initiative and of professional ideals we need have no doubt.

MEDICAL RESEARCH: THE STORY OF SULFANILAMIDE

Abstract of address by Dr. E. K. Marshall Jr. published in the North Carolina Medical Journal, March 1940.

A school of medicine has primarily two objectives: the training of future physicians and the advancement of knowledge by medical research. For the attainment of the first, the second, properly pursued, is necessary. Organized medical research, at least in the so-called preclinical subjects, is a recent innovation. With the partial exception of the anatomic laboratory, laboratories in medical schools for the training of students and for research are largely creations of the last three quarters of a century. The first pathologic laboratory was founded by Virchow in Berlin in 1856; physiologic chemistry as a separate discipline split off from physiology quite late, and Hoppe-Seyler headed the first independent laboratory devoted to this subject at Strasbourg in 1872; pharmacology as the experimental science we now know began when Buchheim established its first laboratory in his private house at Dorpat in 1819. Coincident with the growth of organ-

ized laboratories for medical research the whole face of medicine has changed, and it is probably no exaggeration to say that a greater advance has been made in medicine in this seventy-five year period of laboratories than in all previous medical history. The lot of the diseased person today is immeasurably improved over what it was a hundred years ago. This improvement is the result of the labors of thousands of unknown medical research workers before whom stands the challenge of the prevention, alleviation and cure of human diseases. The lessons of science show, however, that the investigator having a definite practical goal in view frequently defeats his own ends by his impatience of any but the paths that seem direct and obvious. Important discoveries come generally from the work of those who seek knowledge for its own sake. The man into whose lap the fruit of discovery falls has builded on countless pieces of research and the long labors of a host of other investigators. No one can tell when knowledge acquired by an investigator satisfying his intellectual curiosity in a field of medical research apparently quite remote from practical things may be vital to the health of mankind.

Permit me to illustrate. You all know that in the last three years sulfanilamide has been used for the treatment of infections. Its introduction into medicine is to be ranked with the two great therapeutic discoveries of all medicine—the discovery of anesthesia and that of aseptic surgery. The story starts in 1904, when Ehrlich and Shiga first showed that a fatal experimental infection of mice caused by a trypanosome could be cured by a single injection of a relatively harmless red dye. Six years later Ehrlich announced the discovery of a cure for syphilis. Despite advances since Ehrlich's time in the chemotherapy of protozoan infections, nothing of practical importance was developed in the chemotherapy of bacterial infections until the sulfonamide group was introduced. In 1911 Morgenroth and Levy found that a chemical related to quinine—ethylhydrocupreine—would cure pneumococcic septicemia in mice. However, when this remedy was tried in pneumonia in man it was found too toxic to be given in sufficient dosage for effective therapy. In 1908 sulfanilamide was prepared by a chemist, Gelmo, working at the Royal Technical Hochschule of Vienna, apparently solely to satisfy his curiosity. A year later chemists at Elberfeld, Germany, prepared azo dyes with sulfonamide groups and found that they were distinguished by greater fastness to washing and milling than the corresponding sulfonamide-free products. No attempt was made at this time to apply these compounds to the control of bacterial infections. Domagk announced in 1935 that an azo dye containing the sulfonamide group prepared by Mietsch and Klarer would cure an

otherwise fatal streptococcic infection in mice. This compound, azosulfamide, was originally called prontosil. Clinical reports attesting the efficacy of azosulfamide in patients with streptococcic infections appeared shortly before and at the same time as Domagk's announcement of his discovery. Workers at the Pasteur Institute late in 1935 suggested that azosulfamide was broken down in the body to form sulfanilamide, which was found to be as effective as azosulfamide. This important observation demonstrated that a relatively simple organic compound was effective as a chemotherapeutic agent in streptococcic infections. English investigators in 1936 confirmed, as Long and Bliss did later in America, the fact that both azosulfamide and sulfanilamide would cure an otherwise fatal streptococcic infection in mice. With the publication of a paper in 1936 by Colebrook and Kenny of Queen Charlotte Square Hospital in London on the results in child-bed fever, much interest was awakened in these new drugs.

Sulfanilamide has been proved to be a specific in certain infectious diseases in human beings. It produces however at the same time in some cases toxic effects, some of which may endanger the patient's life. Numerous drugs allied to sulfanilamide have been tried. Sulfapyridine has proved about as effective in pneumococcic pneumonia and meningitis as is sulfanilamide in hemolytic streptococcus infections. The question of the mechanism of action of these new drugs is important. If it could be solved, the search for still better drugs for treating infections would be put on a firm scientific basis. Research is needed to complete the picture.

THE PREDICTIVE VALUE OF THE MEDICAL APTITUDE TEST

A study was made at Vanderbilt University School of Medicine, Nashville, Tenn., of 191 students who had taken the medical aptitude test and also of about fifty-five students who were accepted without having taken the aptitude test. The records of the students studied covered in all a period of nine years. The object was to compare the merits of the aptitude test and the premedical grades in predicting the degree of success of medical students; also to determine the degree of correlation between aptitude test scores of premedical students and their success in the four years of medical school work. The data are presented in charts published by Beverly Douglas,¹ the assistant dean. Obviously, if the aptitude test can help to predict the success of a student in the freshman year it is valuable. The aptitude test has never been required at Vanderbilt; nevertheless it has always been advised and in some cases insisted

1. Douglas, Beverly: A Study of the Predictive Value of the Medical Aptitude Test at Vanderbilt School of Medicine, J. A. Am. M. Coll. 13: 380 (Nov.) 1938.

on. It should not be regarded, however, as the sole criterion by which a student should be judged. In summarizing the data presented, the author says that the predicted value of pre-medical grades, both scientific and general, is fair in the case of certain classes and poor in certain others. In none was it significant enough to be used as a sole and presumptive index of a student's likelihood to succeed in medical school. These studies show that premedical grades were not as good a criterion as the aptitude test in predicting the success of students at Vanderbilt; nevertheless they were considered valuable and are expected to become more so as certain colleges improve their courses and grading systems. When the personal rating forms, the premedical grades and the aptitude test scores are considered together

they give a more accurate prediction of a student's worth than when any one or any two criteria are considered in choosing between so many applicants when there are so few places available (each year at Vanderbilt there are more than 700 applicants for the fifty available places), every criterion which has any value should be taken into account. Certain students will nevertheless later defeat all predictions. The author cites a case. Dr. William Sydney Thayer was expelled from Harvard because of a boyish prank and probably would not have been allowed to enter medical school had it not been for the sympathetic efforts of an old English clergyman. The author hopes that, in the endeavor to choose the right applicants for medical training, no Parés and no Oslers will be excluded.

Comments

The number of crippled children registered in forty-five of the states of this country at the beginning of 1940 was 188,579, of which 29,849 were registered in New York, 26,953 in Illinois, 15,343 in North Carolina, 11,304 in Michigan, 10,174 in Texas and 10,049 in New Jersey. Poliomyelitis caused crippling in 36,271 of these persons under 21 years of age, cerebral palsy in 19,172, paralysis due to birth injury exclusive of cerebral palsy in 4,532, tuberculosis of bones and joints in 7,196, osteomyelitis in 11,112 and burns in 4,161.

Hugo Iltis, the biographer of Gregor Mendel, is now professor of physiology at Mary Washington College, Fredericksburg, Va. Dr. Iltis was born in Mendel's home town, Brno, Czechoslovakia, and besides writing the only biography of Mendel he built up the only Mendel museum in the world. A distinguished committee with Henry A. Wallace, Secretary of Agriculture, honorary chairman, has become interested in establishing a Mendel museum in the United

States. Consideration is being given to an appeal to the public for subscriptions to make the Mendel exhibit available to the public. Dr. Iltis collected from the Augustinian monastery at Brno, where Mendel did his work, the original manuscripts of Mendel's papers on atomic heredity, Mendel's diary, letters to and from his contemporaries and Mendel's notes on genetics, bees, meteorology and horticulture.

The number of applicants for admission to the freshman class of seventy-seven medical colleges in the United States in 1939 was 11,800, of whom 6,211, or 52.7 per cent, were accepted and 5,589 were rejected. The 11,800 applicants made 34,871 applications, one applicant having made as many as forty applications, none of which were accepted. The number of applicants dropped in 1939 below 12,000 for the first time in eight years. The percentage of applicants accepted has dropped from 62.1 in 1933 to 52.7 in 1939.—*Fred C. Zapffe*, Chicago, Secretary, Association of American Medical Colleges.

DO YOU KNOW WHAT PHYSICIAN—

1. Sent Paul Revere on his famous ride to Concord and Lexington and later was killed at the Battle of Bunker Hill?

2. Invented (1861) the revolving machine gun, which bears his name?

3. Was Premier of France during the first World War?

4. Wrote "In Flanders' Fields"?

5. Was the first to evolve a system of shorthand writing?

6. Wrote the Adventures of Sherlock Holmes?

7. Was the first president of the Chinese Republic?

The answers are on page 1150.

Medical College News

Medical schools, hospitals and individuals will confer a favor by sending to these headquarters original contributions, reviews and news items for consideration for publication in the Student Section.

The Gold-Headed Cane

Leslie L. Bennett, '40, University of California Medical School, San Francisco, was awarded the gold-headed cane which is given each year to the student adjudged most likely to become eminently successful in his profession. Archer Jule Sokol, '41, and David E. Price, '40, received honorable mention in the cane competition and were awarded copies of a book describing the ancient cane ceremony. The university ceremony is adapted from an old English tradition in which a single gold-headed cane was handed down through several generations of eminent British physicians.

First Appointee to the Luckhardt Fellowship

At the annual banquet of alumni of Rush Medical College in Chicago, June 6, Prof. Anton J. Carlson, toastmaster, announced that contributions to the Arno B. Luckhardt fellowship were now sufficient to provide an income of about \$1,000 a year. The first appointee to the scholarship is Dr. Alexander Rush, the great-great-grandson of Dr. Benjamin Rush, signer of the Declaration of Independence, in whose honor Rush Medical College was named.

Commencement at Jefferson

The graduating class of 125 members at Jefferson Medical College of Philadelphia at the 115th commencement, June 7, brought the total number of graduates of this school to 16,694. Thirty-one members of the graduating class were commissioned first lieutenants in the medical section of the Officers' Reserve Corps, the commissions being presented by Lieut. Col. John F. Corby, M. C., U. S. Army. The graduates originated in twenty different states, Hawaii and Puerto Rico. The class presented to the college a portrait of the dean, Dr. Henry K. Mohler. The valedictory address was delivered by William L. Phelps, Ph.D., Yale University, New Haven, Conn., whose subject was "The Art of Living."

Harvard's National Scholarships

The recipients of national scholarships for admission this fall to Harvard Medical School, Boston, were announced June 9. They are James S. Clarke, LaGrange, Ill., awarded the Daniel Fiske Jones National Scholarship; Martin E. Flipse, Douglaston, L. I., N. Y., the Edward S. Harkness National Scholarship, and Windsor C. Schmidt, Rye, N. Y., the Harvard Medical School National Scholarship. This is the fourth year of Harvard Medical School's scholarship plan.

Additional medical school scholarships totaling \$1,300 were awarded to James P. Dixon Jr., Yellow Springs, Ohio (Matthew and Mary E. Bartlett Scholarship); Lytt I. Gardner, Reidsville, N. C. (Abraham A. Watson Scholarship), and Frank E. Trobaugh Jr., West Frankfort, Ill. (Isaac Sweetzer Scholarship).

Louisiana's Graduating Class

Sixty-nine students of Louisiana State University School of Medicine, New Orleans, received the M.D. degree at the commencement in Baton Rouge, June 3, and forty-five of them were from the state of Louisiana. The five students who made the highest averages were, in order of standing, James T. Nix Jr., New Orleans; Harold B. Levy, Shreveport; William Rigsby Hargrove III, Oakdale; Milton Flocks, Baltimore, and Marion J. LeDoux, New Orleans.

Colorado Students Organize Seminars

The junior students at the University of Colorado School of Medicine, Denver, recently organized seminars in surgery, medicine, obstetrics and psychiatry which will meet monthly at the home of a sponsoring faculty member. The groups are limited to fifteen students, two or more of whom read papers at each meeting. The seminar in medicine, sponsored by Dr. John G. Ryan, is devoting its first two meetings this year to kidney diseases; the seminar in surgery, sponsored by Drs. Frederick Harper, Casper Hegner and Leonard Freeman Jr., is to devote this year's seminars to surgery of the gastrointestinal tract. The seminar in psychiatry, sponsored by Dr. Edward Billings, will devote all of this year's meetings to psychosomatic problems, especially those referable to the heart and gastrointestinal tract. The organization of the seminar in obstetrics has not been entirely completed.

California's Osler Society

Twelve members of the sophomore class of the University of California Medical School, San Francisco, met recently to form an Osler society. The organization will follow the tradition of the Osler Society at McGill University Faculty of Medicine, Quebec, which society has served as a model for many similar societies in this country and abroad. The California society will meet four times a year, at which time papers will be read by members on subjects related to medical history and to the life of Sir William Osler.

Award to Oklahoma Student

The University of Oklahoma has announced three \$50 scholarships to be awarded annually to a member of the senior class of the schools of medicine, law and engineering whose grades are in the upper 25 per cent of the class, who has earned by personal service at least 50 per cent of the cost of his college education to date and who has developed a sense of self reliance and honesty of purpose. Mr. James Lowden Dennis, '40, was this year's recipient from the school of medicine.

Western Reserve Increases Tuition Fees

Western Reserve University announces that the basic fee in its medical school will be increased from \$400 to \$500 for all classes beginning with the academic year of 1941 to 1942. The announcement is made a full year in advance to give students the opportunity to adjust themselves to the situation. The increase is necessary to meet in part the diminished returns of endowments. Incidental fees remain essentially at the present level.

Louisiana Discontinues the Tiger

The *Tiger*, which has been the weekly official organ of the students of the Louisiana State University School of Medicine, New Orleans, since 1932, has been discontinued and a monthly publication to be known as the *Journal of the School of Medicine of Louisiana State University* will be substituted for it. The editor of the new publication is Thomas R. Wilson, '41; Laurence B. Weiss, former managing editor of the *Tiger*, will serve as co-editor. Drs. Edward L. Burns, Hugh C. Ilgenfritz and George W. McCoy will serve as an advisory board from the faculty.

Premedical Symposium at Duke

Duke University School of Medicine, Durham, N. C., presented a symposium on premedical education, April 26, under the auspices of the premedical society of the university. Dr. Frederic M. Hanes was chairman of a clinic for premedical students held in the amphitheater of Duke Hospital, at which several members of the faculty made brief remarks. The clinic was followed by an inspection of the hospital and of the medical school by the premedical students, and at 4 p. m. the public also was invited to hear an address on "Educational Backgrounds for the Study of Medicine" by the dean of the University of North Carolina School of Medicine, Dr. William deB. MacNider. In the evening the public was also invited to a round table discussion on premedical education, at which Dr. Wilburt C. Davison, the dean of Duke University School of Medicine, was chairman. Question boxes were placed at the various meetings and any one present could thus bring up a topic for the round table discussion. The participants in the round table discussion included Dr. MacNider, Dr. Thomas T. Jones, Dr. Charles E. Gardner, several members of the premedical faculty, William M. Eagles, president of the premedical society, and Frank Bone and Arthur A. Morris Jr., premedical students, graduates of the university in 1940. The president of the premedical society was chairman of one of the afternoon meetings.

Wayne Withdraws from Association of Students

The Wayne University College of Medicine chapter of the Association of Medical Students announced, June 5, the severance of its affiliation with that association. This was felt necessary owing to extramedical activities of the Association of Medical Students which the Wayne chapter felt inconsistent with its own policies and those of the Wayne University College of Medicine, Detroit.

Prize Papers at Indiana

Three courses given at the Indiana University School of Medicine, Indianapolis, require term papers: bacteriology, surgical pathology and history of medicine. Recently, however, the heads of all departments were asked for outstanding case reports, essays submitted by students or statistical studies, and 325 papers were received, of which the following were selected for prizes:

JUNIORS

Miss Antha A. Hamilton, First prize—"The Treatment of Hemophilia".....	\$20.00
Harry D. Schell—"Capillary Permeability".....	15.00
Julius T. Steffen—"Physiology of Lymph Production and Flow".....	15.00
Joseph R. Eastman Jr.—"Arteriovenous Aneurysms".....	15.00
Richard K. Parrish—"Local Tissue Immunity".....	15.00
Philip W. Hedrick—"Air Borne Infections in the Surgery".....	15.00
Ottis N. Olvey—"Effects of Obstetrical Anesthetics and Analgesias on the Newborn".....	15.00

SOPHOMORES

Thomas L. Dittmer—"Typhoid Carriers".....	\$15.00
Guy B. Ingwell—"Rocky Mountain Spotted Fever with Special Reference to Indiana".....	15.00
Everett L. Kalb—"Use of Heparin and Sulfapyridine in the Treatment of Subacute Bacterial Endocarditis".....	15.00
Helen M. Sisson—"Impetigo Contagiosa Neonatorum".....	15.00
Otis R. Bowen—"The History of the Practice of Obstetrics".....	15.00
Edgar A. Thompson—"Blood Transfusion".....	15.00

Alpha Omega Alpha

The following members of the class of 1940 at Washington University School of Medicine, St. Louis, were elected to the Alpha chapter in Missouri of Alpha Omega Alpha: Russell J. Crider, Robert E. Buck, Perry C. Gillette, Horace M. Wiley, Seymour Brown, Richard L. Landau, Mary C. McFayden, Paul Guggenheim, Benjamin Strehlman, Wallace Rindskopf Jr.,

Llewellyn Sale Jr. and Leabert R. Fernandez. The following members of the class of 1941 were also elected at this meeting: Henry S. Guterman, Leon Kahn and Earl W. Sutherland Jr.

Temple University

The freshman class at Temple University School of Medicine, Philadelphia, gave its annual dance February 9 in Mitten Hall in honor of the sophomore class. The special guests on this occasion were the junior and senior classes, Dr. and Mrs. Earl A. Schrader, Dr. and Mrs. Robert H. Hamilton Jr. and Dr. Philena Chase. The favors were mother-of-pearl lavalieres with the medical school insignia superimposed.—Dr. Virgil H. Moon, professor of pathology at Jefferson Medical College of Philadelphia, addressed the sophomore class recently on "Shock: Its Mechanism and Pathology." The entire student body was addressed by Dr. Gilbert Dalldorf, chief of laboratories at Grasslands Hospital, Valhalla, N. Y., on "The Clinical and Pathological Evaluation of the Vitamins."—The Babcock Surgical Society has elected John B. Roxby Jr. '41 as secretary-treasurer; next year Mr. Roxby will succeed to the presidency. Student papers were read before the society January 11 by George Shugert '40 on "Primary Tumors of the Lung" and by Joseph Reno '41 on "Cryptorchism"; J. Guy Butters '41 and Joseph R. Connelly '40 read papers before the society, February 14, on "Treatment of Varicose Veins" and "Intercostal Neuralgia," respectively.—The basketball team at Temple University School of Medicine—Jack Moore, Robert Deen, Frederick Reese, Chauncey McGeorge, Norman MacKenzie, Sidney Sedwick, Taras Rybachok, Murray Sigman and Frank Viggiano—has won its fourteenth consecutive game, the recent victims having been Glassboro State Teachers College Alumni, the Temple University football team, and Temple University hospital interns.

Expenses at Long Island in 1940

The secretary for student employment at Long Island College of Medicine, Brooklyn, Dr. Milton B. Handelsman, sent questionnaires to all students at the college regarding their expenses, sources of income and financial difficulties, and 86 per cent of them were returned answered. From these data, the average estimated budget for the present school year for students living at home is from \$1,035 to \$1,135; for those boarding near the school the estimate is from \$1,390 to \$1,490. If scholarships were available to cover the cost of tuition, a student living at home would require only an additional \$425, and a student boarding near school \$780. Among the expenses listed in the average budget were tuition \$610, books and instruments \$100, clothing and the like \$100, room \$180, food \$250, travel expenses \$150, recreation from \$50 to \$100, incidentals from \$25 to \$50, and medical and dental fees from \$10 to \$25.

The data showed that the chief sources of income of 50 per cent of the students were from their parents; however, 14.8 per cent of the seniors, 8 per cent of the juniors, 10.5 per cent of the sophomores and 3.5 per cent of the freshmen were entirely independent of parental assistance. Of the seniors receiving parental support, 58.5 per cent felt that their studies imposed a severe strain on the family finances; of the juniors, 54 per cent; of the sophomores, 37.7 per cent, and of the freshmen, 26.4 per cent. There were many other sources of income; 16.7 per cent of the seniors worked during the school year, about 26 per cent of both the juniors and the sophomores, and 10.3 per cent of the freshmen. Twenty-four per cent of the seniors were

relying on repayable loans, about 12 per cent of the juniors, 15 per cent of the sophomores and 12.7 per cent of the freshmen. Personal savings accounted for the incomes of 16.7 per cent of the seniors and of 21, 15.1, 8.1 of the other classes, respectively. One and nine-tenths per cent of the seniors relied on their spouses for their income, 1.3 per cent of the juniors and 1.2 per cent each of the sophomores and freshmen. The usual amount earned by students performing small jobs through the school year varied from \$150 to \$200. The students who worked during the summer earned on the average a maximum of \$250. With the exception of the freshmen, more than 50 per cent of the students expressed a desire to obtain some remunerative work. Such positions as policemen, chauffeurs, hotel clerks, lifeguards, laboratory assistants, playground directors, counselors in camps, illustrators and seamen were filled by the students who were employed.

Harvard Students in Peru

Henry F. Allen, William P. Carter, Calvin H. Plinpton, Calderon Howe and Ben Eiseman, all of the class of 1943 of Harvard Medical School, Boston, have just returned from Lima, Peru, where, under the direction of the Institute of Public Health, they completed during the summer a survey of the diseases of the rural population, the most prevalent of which were said to be leishmaniasis, oroya fever and verruca peruana.

Prizes Awarded at Colorado

The following prizes were recently awarded to students at the University of Colorado School of Medicine, Denver: Miss Dorothy J. Clark, '42, received the 1940 Chester H. Elliott Memorial Prize in pathology, amounting to about \$30, for showing the greatest proficiency in the second year courses in pathology. Robert S. Redwine, '43, received the 1940 Alpha Omega Alpha Prize of \$25 in anatomy, the winner having been designated by the faculty of that department. Miss Winifred M. Riggs, '41, was awarded the Carbon Gillaspie Memorial Prize of \$25 in applied anatomy for having shown exceptional scholarship and technical skill in the course in that department. Robert W. Rasor, '41, and Chester P. Stevenson, '41, received the 1940 \$10 prize offered by Dr. John G. Ryan for the best case report prepared by a senior or junior student.

Pennsylvania State Board Questions

The following questions were given by the Pennsylvania State Board of Medical Education and Licensure at the examination in Harrisburg, July 10, 1940:

GYNECOLOGY AND OBSTETRICS

1. Outline the management of the second stage of labor.
2. Discuss the treatment of pregnancy when complicated by essential hypertension and appearing in the first trimester.
3. Given a symmetrical pelvis with a diagonal conjugate diameter of 10.5 cm., how would you determine the proper management when the patient is at term?
4. Differentiate "retained placenta" from "adherent placenta"; outline treatment in a case of retained placenta.
5. Give the clinical course of a case of pernicious vomiting of pregnancy. What are the salient points in its treatment?
6. How will you diagnose and treat a case of infected incomplete abortion?
7. In a woman 30 years of age, what symptoms would occur from a retrocessed uterus, and how would you diagnose this condition? Detail one method of treatment.
8. What are the most frequent causes of postmenopausal uterine bleeding? Select one and give its diagnosis and treatment.
9. Give the differentiated diagnosis of four conditions which may cause enlargement of the abdomen in a woman 40 years of age.
10. What are the clinical aspects of trichomonas infestation of the vagina? Differentiate this from other types of vaginitis.

Prizes Awarded at Western Reserve

Gerald T. Kent, '40, a graduate of Western Reserve University School of Medicine, Cleveland, has been selected by the faculty of the school for the Charles F. Hoover Scholarship for 1940 in recognition of his outstanding scholastic record. Dr. Kent will serve as assistant in pathology until February, when he will take up his duties as intern in medicine at the University Hospitals.—The annual Alpha Omega Alpha awards have been made as follows: first prize to Robert E. Eckardt, '43, for his paper on "Vitamin B₁₂, Its Isolation, Synthesis and Physiology"; second prize to Daniel A. Brody, '40, for his paper on "Physical Factors in Gastric Evacuation"; third prize to John M. Cook, '40, for his paper on "A Study of Carbohydrate Digestion."—Samuel R. Ziegler, '40, was awarded the senior prize in obstetrics, the gift of Dr. Edwin C. Garvin; Jac Sidney Geller, '40, was awarded the senior prize in surgery, the gift of Dr. Elliott C. Cutler, and Eugene R. K. Leiter, '43, was awarded the Herbert S. Steuer Memorial Award for special work in anatomy.

Dr. Alvarez Gives McCoy Lecture

The students in New Orleans medical schools and the interns at Charity Hospital were invited to the inaugural lecture of the George W. McCoy lectureship, given at the Jung Hotel, March 26, by Dr. Walter C. Alvarez, of the Mayo Clinic, Rochester, Minn., on "The Origins of Modern Medicine." This annual lecture has been established by the Phi Beta Pi fraternity in honor of Dr. George W. McCoy, for many years a prominent officer in the U. S. Public Health Service and recently also professor of preventive medicine and public health at Louisiana State University School of Medicine. Dr. McCoy is a member of the Council on Pharmacy and Chemistry of the American Medical Association, of the National Board of Medical Examiners, of the Permanent Standards Commission of the Health Section of the League of Nations and of many scientific societies. He was awarded the Sedgwick Medal of the American Public Health Association in 1921.

Vanderbilt Sophomores Elected to Honorary Society

The Vanderbilt sophomore medical students elected to the local chapter of Alpha Omicron Alpha, national honorary medical fraternity, this year were John R. Hilsenbeck, Charles L. Cogbill Jr. and James H. Baxter. Only three members of the sophomore class are taken into this honorary fraternity each year, membership in which is based on scholarship and character.

Maryland's Recreation Center

The completion of the spacious Frank C. Bressler Research Laboratory has provided two floors in the Gray Laboratory Building which have been given over to the students for a lounge and recreation center. The students have enjoyed a program of medical motion pictures, lectures and the first student body dance in many years.

Undergraduate Honor Society at Louisiana

Announcement has been made of the formation of The Circle, an undergraduate honor society in the Louisiana State University School of Medicine, New Orleans, under the sponsorship of a faculty committee consisting of Drs. B. I. Burns, dean, Charles Midlo and James D. Rives. The fourth year membership is limited to the upper tenth of the senior class, and the third year membership to the three highest ranking students in the junior class.

Iowa Student-Faculty "Mixers"

Two committees have been appointed independently at the State University of Iowa College of Medicine to bring the students and faculty members together in activities of a social and cultural nature. The Student Council comprises one of these committees and the chairman of the other is Helen L. Dawson, Ph.D. Last year the two committees carried out similar programs providing for special speakers, movies and music, followed by a longer interval of good fellowship, with refreshments. The highlights of these programs were "Colored Movies of Old Mexico," made by Dr. Nathaniel G. Alcock; a talk by Dr. William D. Paul on "American Pattern Glass," a hobby; "Tall Tales of the Mississippi," by William J. Petersen, Ph.D., of the history department, and an amusing and scientific discussion of "Foulk's Law as a Basis for Predicting Postcurricular Achievement," by Col. J. J. Hinman. One of the most popular programs was a "Professor Quizz," in which a team of students and a team of faculty members opposed each other and for which the student prize was won by John M. Rhodes and the faculty prize by Walter R. Ingram, Ph.D.

Syracuse Personals

Edward M. Nutting, '41, of Syracuse University College of Medicine, Syracuse, N. Y., lost his life this summer by drowning.—Miss Mary Elisabeth Herberich, a senior, has been awarded the Dr. Menzo W. Herriman Scholarship, a full tuition award which is given annually to one of the five highest ranking students in the senior class. Miss Herberich is the first woman student to receive this award.—Six of the forty-eight new freshmen medical students at Syracuse this fall are sons of physicians. The class also includes three women.

Dance to Aid Students

The annual dance of the students of Long Island College of Medicine, Brooklyn, cleared about \$400, which was turned over to the Student Loan Fund.

Tufts Freshmen Awarded Commonwealth Scholarships

The Commonwealth Fund has awarded scholarships to four students who will enter Tufts College Medical School, Boston, this fall as freshmen. Each of the four recipients will receive \$1,000 for each of his four years of medical training, but he must agree to practice in a rural community in his home state at least three years following his internship. The scholarships have been awarded to C. Clark Streeter, West Somerville, Mass.; Clarence W. Whittaker, Easton, Maine; Frank E. Perron Jr., Manchester, N. H., and Theodore W. Ling, St. Johnsbury, Vt. All four recipients have B.S. degrees.

Prizes Awarded to Tulane Students

The dean of Tulane University of Louisiana School of Medicine, New Orleans, Dr. Maxwell E. Lapham, announced the following list of prizes and honors awarded to some of the 1940 graduates: William H. Harris Jr., a gold medal for the highest combination average in the four year course in medicine. This is the Isadore Dyer Memorial Medical Scholarship Prize. Stephen L. Stigler, the Sidney K. Simon Prize of \$50 for his essay entitled "Vitamin K." A similar prize was awarded to Charles J. Edwards Jr. for his thesis "Alcoholism and Vitamin Deficiency." Mayo L. Emory and John J. Christian were awarded copies of Musser's book on internal medicine for the best theses in medicine. Edward B. Ferguson Jr., of the freshman class, was awarded the biochemical scholarship cup in the annual competitive oral examination.

Colorado Juniors Give Psychiatric Plays

The junior class at the University of Colorado School of Medicine, Denver, gives an amateur play each year dramatizing some psychiatric problem or situation. The plays are produced, acted and directed by members of the class, and the costs are underwritten by Dr. Franklin Ebaugh, professor of psychiatry. The last production, entitled "Doctor, Feel My Pulse," dealt with a family situation in which a mother-in-law and a timid husband make a young wife's life miserable. The family physician recommends calling in a psychiatrist, who endeavors to resolve the family problems by showing the wife how to use her wits, the husband, how to become more masculine and the mother-in-law how to be less domineering. The play was directed by John Ames, '41, and the parts in the order of mention here were taken by Winifred M. Riggs, '41, Claude O. Roberts, '41, Mary Barker, a student nurse, Howard Hamlin, '41, and John Benwell, '41.

Ohio Personal

Howard J. Scott, a senior at Ohio State University College of Medicine, Columbus, is the recipient of the first award from the Conly-Coleman Scholarship Fund, which provides for a full year's tuition. Our correspondent writes: "Because of 'Scotty's' sincere and indomitable spirit, his selection will be greeted by the hearty approval of his classmates."

Awards to Jefferson Students

At the 115th commencement of Jefferson Medical College of Philadelphia, June 7, the following students were awarded prizes:

Alan M. Schaeffer received the Henry M. Phillips Prize of \$75, awarded on recommendation of the professor of medicine to the graduate in his opinion the most worthy.

Harvey K. Mechanik, the Henry M. Phillips Prize of \$75, awarded on recommendation of the professors of surgery to the graduate in their opinion most worthy.

William W. Kitchin, a gold medal, awarded by bequest of Dr. Francis W. Shain for the best essay on a subject pertaining to the practice of medicine.

James R. Herron Jr., a gold medal, awarded by bequest of Dr. Francis W. Shain for the best essay on a subject pertaining to surgery.

Theophilus H. Boysen III, \$25 by Professor Brooke M. Anspach for the best examination and clinical report on gynecology.

Richard H. Saunders, \$25, by Prof. Horace J. Williams for the best examination in otology.

George F. Lull Jr., a gold medal, for general excellence in clinical surgery, in memory of Francis T. Stewart.

Clyde A. Collins, \$25, by Prof. Norris W. Vaux for the best examination in obstetrics.

Francis X. Bauer, \$25, by Prof. Edward L. Bauer for the best examination in pediatrics.

Harvey K. Mechanik, \$25, by Prof. Charles E. G. Shannon for the best examination in ophthalmology.

Thomas H. Auginbaugh Jr., \$25, by Prof. Louis H. Clerf for general excellence in laryngology and bronchoscopy.

John L. Simon, \$25, by Prof. Bernard J. Alpers for the best examination in neurology.

John C. Grier Jr., \$25, by Clinical Prof. Baldwin L. Keyes for the best examination in psychiatry.

Richard L. Wagner, a gold medal, for the best examination in therapeutics.

Alan M. Schaeffer, the William Potter Memorial Prize awarded to a graduate attaining the highest general average in the final two years of the medical course.

Harvey K. Mechanik, a medal, awarded by the alumni association for the best general average gained in the examinations for the entire curriculum.

Thomas M. Scariaciotoli, a gold medal, awarded by bequest of Dr. Francis W. Shain, open to undergraduates of the second year for the best essay or examination on a subject pertaining to physiology.

John A. Pilster, a gold medal, awarded on completion of the sophomore year to the student with the highest grade in anatomic subjects of the first two years.

Frank T. O'Brien, a gold medal, awarded by Prof. J. Parsons Schaeffer for the best thesis in the science of anatomy.

John L. Simon, the W. B. Saunders Company Prize for the best general examination at the end of the senior year.

Frederick B. Wagner Jr., the D. Appleton-Century Company Prize for the best general examination at the end of the junior year.

Tulane's Quiz in Biochemistry

Edward B. Ferguson Jr., '43, Tulane University of Louisiana School of Medicine, New Orleans, who was named winner of the annual biochemistry oral quiz, will be presented with a book and a loving cup to be held for one year. The ten students having the highest average in the biochemistry class are eligible for the quiz, which questions are asked by the entire biochemistry staff. William D. Davis Jr., '43, was named runner-up.

Iowa Personals

The annual Baldrige-Beye Memorial Prize of \$100 for original scientific work at the State University of Iowa College of Medicine was awarded to Albert P. McKee, '41.—Byron H. Evans and Dwight Sattler were awarded associate membership in Sigma Xi on the basis of scholastic excellence and original research.—The following medical students were elected to membership in Alpha Omega Alpha during the last year: Forest H. Coulson, Byron H. Evans, Robert H. Foss, John H. Laubscher, Frederic G. Loomis, John J. Maloney Jr., Robert C. Miller, James W. Standeven, Thomas F. Thornton Jr., George I. Tice, Charles A. Waterbury Jr., John M. Rhodes, Margaret L. Vanderwilt, Samuel V. Thompson and Henry E. Hamilton.

Senior Awards at California

In the award of the annual Guy K. Woodward competition for fourth year medical students at the University of California, San Francisco, the first prize of \$150 went to Julian S. Davis of San Francisco for his paper on "Coronary Occlusion with Special Reference to the Electrocardiographic Changes"; the second prize to Theodore E. Diller, San Francisco, for his paper on pellagra, and the third prize to Robert W. Godwin, Long Beach, Calif., for his paper on Ménière's disease. Milton Gordon, San Francisco, and Harry Levitt, Los Angeles, were given honorable mention. The awards were presented by Dr. William J. Kerr, professor of medicine.

Guest Lectures at St. Louis

Dr. Paul S. Barker, assistant professor of internal medicine, University of Michigan School of Medicine, Ann Arbor, addressed the junior and senior classes of St. Louis University School of Medicine at a special lecture on "Heart Disease in Pregnancy."—Dr. Robert S. Berghoff, professor of clinical medicine, Loyola University School of Medicine, Chicago, lectured at a seminar, April 24, on "Senile Ectasy." The lecture was sponsored by Alpha Omega Alpha.

Emory A. O. A. Members

At a dinner meeting in May, Emory University chapter of Alpha Omega Alpha honorary medical society at Atlanta, Ga., initiated the following new student members: Julian C. Pate, Tampa, Fla., John Ranson Lewis Jr., Louisville, Ga., and George L. Beale, Cairo, Ga. Following the dinner, the annual Alpha Omega Alpha lecture was presented by Dr. Virgil P. Sydenstricker, professor of medicine at the University of Georgia School of Medicine.

Virginia Personal

Dr. Reginald Fitz, Harvard Medical School, Boston, was the speaker at the commencement closing the one hundred and second session of the Medical College of Virginia, Richmond, June 4. There were sixty-eight candidates for graduation in medicine.

Premedical Club at Ohio State

Ohio State University's premedical club was formally installed, May 31, as a chapter of Alpha Epsilon Delta, national premedical fraternity, at which twenty-nine students and four faculty members were inducted as charter members. Honorary members of the charter group are Dr. H. E. Setterfield, associate professor of anatomy, and Dr. Raymond J. Seymour, professor of physiology at the college of medicine. The installation dinner was held in the Pomerene Hotel, with Emmett B. Carmichael, Ph.D., national councilor of the fraternity and a faculty member at the University of Alabama, as the installing officer. Following the dinner, the fraternity sponsored an open meeting. Membership is limited to juniors or seniors who have a cumulative average of B in all studies. Alpha Epsilon Delta which was founded at the University of Alabama in 1926 now has twenty-nine chapters. It was first limited to men, but since 1929 has been open to women also.

The Bel Award at Louisiana

Dr. James T. Nix Jr., '40, Louisiana State University School of Medicine, New Orleans, received the George S. Bel Memorial Award of \$50, which was given for the first time this year. The winner was selected by a committee of the faculty from the ten highest ranking students. Mrs. Bel stipulated that the award should be presented to the senior student who "symbolizes the highest ideals of medicine"; the prize was established in memory of her husband, the late Dr. George S. Bel, who was director of the department of medicine for many years.

Howard College

Dr. Louise H. Branscomb, Birmingham, Ala., addressed the twelfth annual founders' day banquet of the Howard College chapter of the Alpha Epsilon Delta honorary premedical fraternity, May 15, on "Women in Medicine."

"DO YOU KNOW WHAT PHYSICIAN"

Following are answers to the questions appearing on page 1145:

1. Dr. Joseph Warren of Boston, an ardent patriot. Dr. Warren had a high reputation as a physician and was retained by John Adams, who was later president of the United States, as his family physician.
2. Dr. Richard J. Gatling, who graduated from Ohio Medical College in 1850, after having become interested in the study of medicine through an attack of smallpox. He was born in North Carolina and was for some time a practitioner of medicine in Indianapolis. Dr. Gatling died in New York, Feb. 26, 1903, after the Gatling gun had been adopted by almost every great nation in the world.
3. Dr. Georges Clemenceau, who practiced medicine in New York and later in Paris as a dermatologist.
4. Dr. John McCrae of Montreal, Canada, who was lecturer in pathology and internal medicine at McGill University and formerly professor of general and special pathology at the University of Vermont, Burlington. Dr. McCrae was killed in service during the first World War.
5. Dr. Timothy Bright, who graduated in medicine at Cambridge, England, in 1574. His system had an alphabetical basis using the initial of each word.
6. Arthur Conan Doyle, who received his M.D. degree from Edinburgh in 1885. He was knighted in 1902.
7. Sun Yat-sen, who graduated from the College of Medicine in Hong Kong in 1892.

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SIGNIFICANCE OF THE TONSILS IN THE DEVELOPMENT OF THE CHILD

CHAIRMAN'S ADDRESS

ALBERT D. KAISER, M.D.

ROCHESTER, N. Y.

During the last thirty years many significant facts have been ascertained relative to the growth and to the development of the child. Particular attention has been given to the status of the tonsils and adenoids as one of the factors that may influence the child's physical progress. In this period an increasing number of children have been classified as possessing hypertrophied or diseased tonsils resulting in the surgical treatment of the tonsils in nearly 50 per cent of urban children in the United States and England. This situation invites a survey of the tonsil problem and an evaluation of the tonsils as a factor in the child's development.

It is of interest to note that in 1888 W. Franklin Chappell⁵ surveyed 2,000 children in New York to determine the frequency of certain abnormal conditions of the tonsils. He concluded that 3 per cent of the children had tonsils sufficiently enlarged to require surgical treatment. Twenty years later Gibb⁶ reported on a group of boys at Girard College in Philadelphia and stated that 30 per cent were found to have either hypertrophied tonsils or adenoids or both. During the last twenty years more than 50 per cent of the children in many cities of the United States have been designated as having either hypertrophied or diseased tonsils which necessitated their removal. It is obvious, therefore, that either the lymphoid tissue of the child's nasopharynx has assumed a more formidable position in the throat or the standards for judging the significance of the tonsils have changed. It seems quite unlikely that the tonsils are more frequently hypertrophied today than they were forty years ago. With the lessened morbidity from such diseases as diphtheria and scarlet fever, considered potent factors in producing hypertrophy of the tonsils, one would expect to find fewer children with hypertrophied tonsils. This intensified interest in the tonsils, and the subsequent surgical treatment must be explained by the changed attitude toward the tonsils. In fact the real issue in the discussion dealing with the tonsil problem is to decide whether the widespread incrimination of the tonsils is scientifically sound and if it is in the interest of the child's health. Whatever

influences may have been responsible for bringing about the present attitude toward the tonsils and adenoids, it must be recognized that surgery of the tonsils has been widely accepted as both a therapeutic and a prophylactic procedure. The beneficial results following tonsillectomy in selected cases cannot be refuted. When, however, this procedure is applied to half of the children during their school years, it is reasonable to question whether the tonsils can be incriminated in such a high percentage of children and whether the surgical treatment of the tonsils in these children contributes anything to their health.

THE TONSIL PROBLEM TODAY

The problem that confronts the physician today is When should the tonsils be considered a menace to a child's development? There is no dispute as to the surgical procedure when once this decision is made. In obvious cases of hypertrophy and infection of the tonsils the clinical signs are sufficient to direct the course the physician must take. However, in many of the children subjected to surgical treatment of the tonsils in recent years the clinical evidence for tonsillectomy was not clear, for it was not certain that the suspected tonsils were influencing the child's health favorably or unfavorably. For years physiologists have assigned various functions to the tonsils which have not been uniformly accepted. Bacteriologists have reported on the bacterial flora found in the tonsils either from culture or from a study of the tonsils after their removal, but these studies give no substantial aid to the clinician in the problem of deciding whether the tonsils in a given case are a menace to the child's health. As no laboratory test is available to determine whether the tonsils are beneficial or harmful to the child, the clinician's decision must rest on his own experience, on his estimate of all the factors that contribute to the child's well being and on the statistical experience of others. Though one would like to apply rigid scientific standards for evaluating the significance of the tonsils in the development of the child, it is quite obvious that such standards are not known and one must resort to clinical investigations. In approaching the clinical study of this problem one encounters numerous pitfalls which make one wonder whether the clinical and statistical studies recorded present the true picture of the tonsil problem. Selkirk and Mitchell⁷ have pointed out that it is difficult to evaluate results in tonsillectomized children because of the variables that exist. The numerous surveys that have been made are based on the accumulation of data which are not obtained by the same methods, so that one must question the real value of such conclusions. When separate and intensive studies of a single symptom in relation to tonsillectomy have

Read before the Section on Pediatrics at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940. Owing to lack of space, this article has been abbreviated for publication in THE JOURNAL. The complete article appears in the author's reprints.

5. Chappell, W. F.: Am. J. M. Sc. 97:148, 1889.

6. Gibb, J. S.: Tr. Am. Laryng. A., 1909.

7. Selkirk, T. K., and Mitchell, A. C.: Evaluation of the Results of Tonsillectomy and Adenoidectomy, Am. J. Dis. Child. 42:9-41 (July) 1931.

been made, more reliable results have been obtained. Whatever clinical methods are employed, it is essential that control studies should be made simultaneously with those whose tonsils have been removed. For a fair comparison, similar age groups must be utilized and uniformity in the method of examination and follow-up

sequence and the number of their respiratory infections over a period of years. If the expected development in the group in which the tonsils were removed follows a trend significantly different from the group in which the tonsils were not removed, it might be assumed that the presence or the absence of the tonsils has some influence on the physical development of the child. Such studies have been undertaken to determine whether certain infections are lessened by the removal of the tonsils. With no true normal group available, my associates and I endeavored to compare children of like age and environment whose tonsils were removed with a similar group that presented the same indications for their removal but on whom no operation was performed.

THE PRESENT STUDY

Consideration has been given to the common infections of the upper respiratory tract, tonsillitis, the common cold, otitis media and cervical adenitis. The pulmonary infections bronchitis and pneumonia have been investigated and the various manifestations of rheumatic infection have been recorded. Several reports have been made on a large series of children and on control groups in which these various complaints have been followed for a period of ten years.⁸ From these studies it is noted that tonsillitis is a common complaint in young children. Approximately 38 per cent of the 4,400 children utilized in the study were subject to repeated attacks of tonsillitis (at least two febrile attacks a year) during the first seven years of life. Tonsillectomy was advised for all 4,400 children for various reasons but only half of the group submitted, and none of the children in the control group of 2,200 children were operated on during the succeeding years. As is indicated in chart 1, the incidence of sore throat was decidedly lessened during the first three years following the operation and then increased somewhat during the next seven years, but the trend was decidedly downward. In the group in which the operation was not done attacks of tonsillitis recurred with only a slight decrease in frequency during the same years in which the children who were operated on showed a

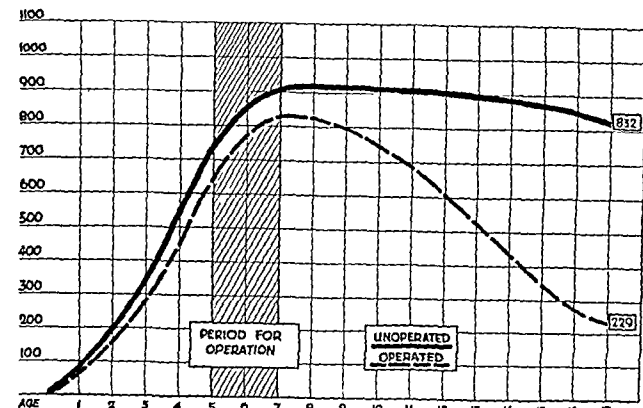


Chart 1.—Tonsillitis and sore throat among 2,200 tonsillectomized and 2,200 nontonsillectomized children.

must be observed in the two groups. Recognizing the difficulties in obtaining genuine control material, it is still possible to get a fair opinion as to the trend of the child's reaction to certain symptoms. Utilizing Yule's formula for determining whether the variation in the trends is significant or not offers some help in evaluating the significance of the tonsils with reference to certain pathologic conditions.

It is generally accepted by physiologists and by clinicians that normal and uninterrupted growth and development in a child requires a sound body at birth. Adequate food intake fortified with the necessary minerals and vitamins is essential during the first few years of life. Acute and chronic infections are known to halt or to retard the development of the child. To minimize the number and the severity of the infections in infants and in young children, specific protective vaccinations are given. Other precautions in protecting the child against infection are taken that might be termed social or environmental. Severe or repeated infections in the nasopharynx and adjoining organs are known to interfere with the uninterrupted development of the child. It therefore seems logical to improve, if possible, the zone in which the infections usually originate. The tonsils and adenoids are not only in this zone of frequent infection but are frequently the victims when pathogenic organisms gain entrance into the nasopharynx. Sufficient clinical evidence is available to show that the tonsils may impede the development of a child either through hypertrophy or as a reservoir of infection. Experience again and again has shown that enucleation of such tonsils removes the focus of infection and permits the growth and the developmental process to proceed without further handicap. In such instances it seems quite certain that the tonsils were a liability to the child and their removal was highly desirable. Can one, however, deduce from these occasional cases that normal tonsils encourage infections of the throat and therefore share with the infections themselves a deterring influence on the child's development? Again mindful of the fact that no convincing scientific evidence is at hand to explain the part the tonsillar tissue plays in the economy of the child, it becomes necessary to follow the development of a group of children to adolescence, recording the

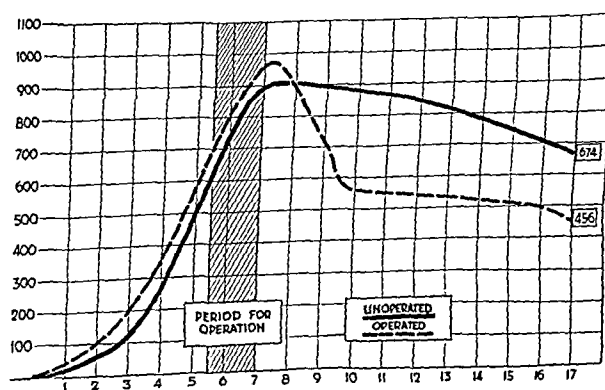


Chart 2.—Colds (four or more a year) among 2,200 tonsillectomized and 2,200 nontonsillectomized children.

lessened incidence. When one compares the incidence of this infection in the two groups it is obvious that the common ailment termed tonsillitis or sore throat occurred less frequently in the cases in which the tonsils had been removed. In other studies, notably those of Selkirk and Mitchell,⁷ similar results were obtained as far as this complaint was concerned.

8. Kaiser, A. D.: The Relation of Tonsils and Adenoids to Infections in Children, *Am. J. Dis. Child.* 41: 568-581 (March) 1931.

The common cold with its unpleasant complications has frequently influenced physicians and parents to remove the child's tonsils and adenoids, hoping that fewer colds will develop following the operation. It was noted that the incidence of head colds (chart 2, four colds or more a year) occurred with about

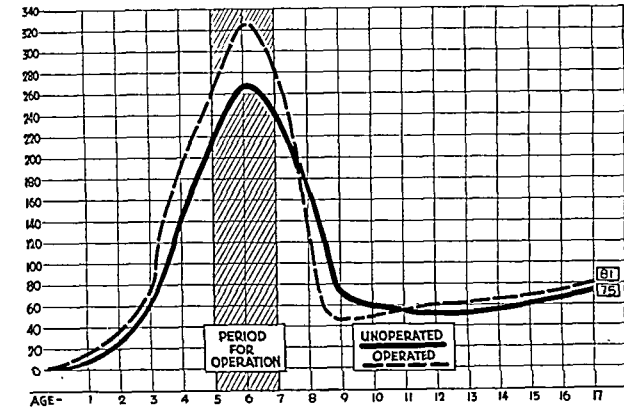


Chart 3.—Otitis media (purulent) among 2,200 tonsillectomized and 2,200 nontonsillectomized children.

equal frequency in the two groups under observation. Approximately 42 per cent of the children were subject to this repeated infection up to the age of 7 years. Following the operation for a period of three years the surgically treated children enjoyed greater freedom from colds than those who did not receive surgical treatment. During the next seven years of observation the children who were operated on actually had more colds than the group who were not. Considering the entire ten year period it must be concluded that the children who were operated on showed only a slight advantage over the children who were not, an advantage which cannot be considered statistically significant. It is quite likely that removal of the adenoids benefited the younger children but as the children advanced in years the adenoid tissue retrograded, so that the children who were not operated on were likewise benefited. Though the trend as far as frequent colds are concerned is downward as the child grows older, there is insufficient evidence to show that the removal of the tonsils is solely responsible for this decline in incidence.

Utilizing the same group for the effect of tonsil and adenoid removal on the incidence of purulent otitis media, we noted that 15 per cent of the children who were subsequently operated on had suffered from purulent otitis media before the ages of from 5 to 7 years, while in the control group 12 per cent were likewise affected. During the three year period following tonsillectomy nearly twice as many children who were not operated on had purulent ear infections, but during the next seven years these children fared as well as and even a little better than those who were operated on. It seems quite certain that ear infections are somewhat influenced by age, for regardless of the presence or absence of the tonsils this type of infection becomes less frequent after the eighth year of life. Again it seems probable that the removal of the adenoids was of distinct benefit to the younger children who were subject to ear infections. Once a middle ear infection in the mastoid in tonsillectomized children as in those whose tonsils and adenoids have not been removed. Undoubtedly catarrhal otitis media that leads to impaired hearing is frequently relieved by adenoidec-

tomy in early childhood, but from a study of this group, as chart 3 indicates, the tonsils have no constant relation to infections in the ear.

Cervical adenitis is a common infection in childhood. In each group of this study 15 per cent of the children had definite enlargement of the cervical glands before the ages of 5 and 7 years. Only children in whom there was a visible enlargement of the cervical glands have been considered. In some children this evidence of infection was acute, while in others the enlargement lasted for weeks or for months. During the three year period following tonsillectomy the incidence of cervical adenitis in the children who were operated on was 5 per cent as compared to an incidence of 14 per cent in the children who were not. Over a longer period of time a number of the tonsillectomized children showed a recurrence of cervical adenitis, accounting for an incidence of 7 per cent at the end of ten years, while among the children used as controls the incidence of this complaint was 14 per cent. The statistical evidence in this study as well as in other reported studies shows a significant favorable trend for the relief of this complaint in the groups in which a tonsillectomy had been done.

Though the presence or the repeated occurrence of infections of the upper respiratory tract in children serves as the most common indication for the removal of the tonsils, the subsequent incidence of pulmonary infections must be considered. Pulmonary infections occurred more frequently in children in the first five years of life than in the next ten years. Such is the usual incidence of these infections. Undoubtedly in our groups some children subject to pulmonary infections were operated on because of this tendency, for more of the children who underwent the operation had repeated attacks of bronchitis and pneumonia before the ages of 5 to 7 years than in the group of children who were never operated on. In spite of this, the trend was definitely for more pulmonary infections in the tonsillectomized group over the ten year period than for the control children. It seems that the absence of the tonsils either increased the chances of developing bronchitis

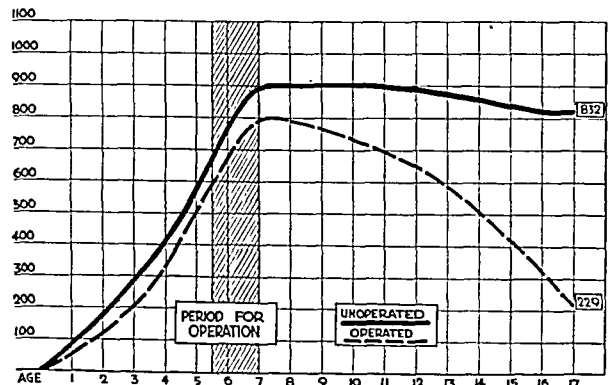


Chart 4.—Cervical adenitis (acute and chronic) among 2,200 tonsillectomized and 2,200 nontonsillectomized children.

and pneumonia or else the tonsillectomized group represented the more susceptible individuals and the operation was not responsible for the increased incidence of pulmonary infections.

Chronic or recurrent diseases such as tuberculosis, asthma, nephritis, diabetes and rheumatic fever are known to influence the development of the child. In the prevention or the control of these diseases the role of the tonsils must be considered.

Statistical studies have been made on 500 children from 5 to 14 years of age in whom positive signs of tuberculosis existed. All the children gave a positive reaction to the intradermal tuberculin test and showed roentgenologic evidence of tuberculosis. An analysis of this group with reference to the presence or absence of the tonsils and the age at which they were removed

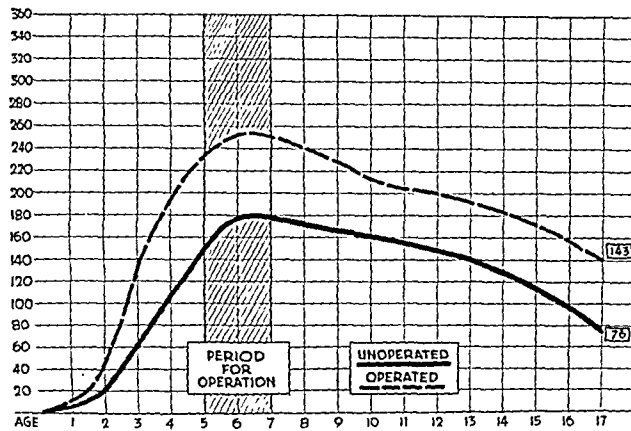


Chart 5.—Pulmonary infections (bronchitis and pneumonia) among 2,200 tonsillectomized and 2,200 nontonsillectomized children.

showed that no significant relationship could be demonstrated between the development of tuberculosis and the presence or the absence of the tonsils. When tuberculous cervical adenitis is considered it is quite clear that the tonsils are frequently a source of entrance for the tubercle bacillus and the removal of the tonsils may reduce the incidence of this tuberculous manifestation.

Children with nasal allergy, allergic involvement of the sinuses, allergic bronchitis and allergic pneumonia are not favorably influenced by tonsillectomy. Bullen⁹ in a study of 2,000 children concluded that tonsillectomy does not aid in improving the results of treatment of nasal or of pulmonary manifestations of allergy. Recently Hansel and Chang¹⁰ reached similar conclusions. They caution against the removal of tonsils and adenoids in allergic children during attacks of hay fever and against recourse to tonsillectomy with the idea of alleviating allergic symptoms.

Rheumatic manifestations in children have long been associated with infection in the tonsils. This relationship received the support of Osler in 1902, who stated "Special stress has been laid upon the tonsils as the point of entrance of the infections, as it has long been known that tonsillitis was a very frequent initial symptom. Indeed some have gone so far as to say that there is always a primary infective trouble in the lacunae of the tonsils, to which the rheumatic fever is secondary, arising from the absorption of microbes or their products." Subsequent writers stressed this relationship, which gave rise to the common dictum "the tonsil, the portal of entry of rheumatic infection." This resulted in a form of speech that became almost a platitude in the course of medical literature to the degree that it was accepted and dispensed with the regularity of an acquired habit and no doubt frequently without stopping to inquire how far it agrees with personal experiences and recurring clinical material. The various attempts to evaluate the relation of the tonsils to infections included rheumatic manifestations. These studies emanating from various parts of this country and from

England agree that there is no justification in the statements that were accepted for more than twenty-five years. No unanimity exists in these studies, owing in part to a different approach, but in general it has been shown that any rheumatic manifestation may develop in a child whose tonsils have been removed prior to the first evidence of rheumatic disease. There is also complete agreement in the statement that recurrent attacks of rheumatic disease are as likely to occur in children whose tonsils have been removed as in those in whom they are still intact. There is, however, some difference of opinion as to the influence of the tonsils on the cardiac complication and on the mortality in this disease.

The survey made in Rochester gives a fair idea of the incidence of rheumatic manifestations in two large groups of children. It is noted that chorea seems not to be influenced favorably by tonsillectomy; in fact, primary attacks were somewhat more frequent in tonsillectomized children. Rheumatic fever occurred somewhat less frequently in the tonsillectomized children. This difference may be explained by the lessened incidence of throat infections in the children who were operated on. The mild rheumatic symptoms termed muscular or growing pains occurred frequently in both the tonsillectomized and the control group. Though the children who were operated on had somewhat less evidence of trouble, the difference in the two groups was not statistically significant. Rheumatic carditis was studied in the 4,400 children in a similar manner to that in which the other rheumatic manifestations were studied. The incidence of carditis did not differ much in the two groups. During the ten year period in which these children were observed, it developed that 1.1 per cent of the children contracted rheumatic carditis following tonsillectomy, while among the children whose tonsils were not removed 1.3 per cent contracted the same lesion. The difference is not significant. It would appear from the figures that tonsillectomy did not have much to offer either in the prevention or in the control of rheumatic infection. A further possible relationship of the tonsils to rheumatic infection was sought in studying the outcome of a group of rheumatic children. This observation was made on a group of 597 children who had developed their first attack of rheumatic infec-

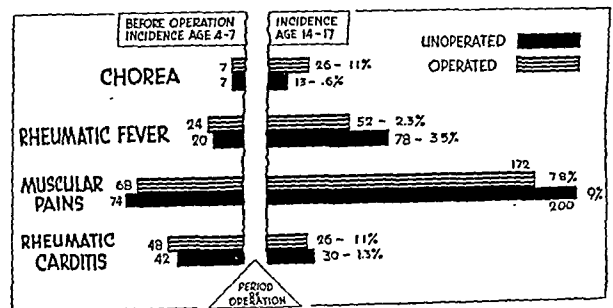


Chart 6.—Rheumatic manifestations before and for ten years after removal of tonsils of 2,200 children and for a similar period among 2,200 nontonsillectomized children.

tion between the ages of 5 and 10 years. All these children either were observed for a period of ten years after their primary attack or succumbed to the disease during this period.

In table 1 it is noted that these children could be divided into three groups: those whose tonsils were in at the time of the primary attack and remained in during the five year period of observation, those whose

9. Bullen, S. S.: *J. Allergy* 11: 310 (July) 1931.

10. Hansel, F. K., and Chang, C. S.: *Relation of Allergy and Tonsillectomy in Children*, *Arch. Otolaryng.* 31: 45 (Jan.) 1940.

tonsils were out at the time of the initial attack and those whose tonsils were in at the time of the initial attack but were removed subsequently during the five year period of observation. The mortality rate (table 2) is distinctly higher in the group of children whose tonsils were not removed. Though the recurrences were about the same in the three groups, the children who were operated on appeared to be somewhat safeguarded. A similar experience has been commented on by several clinicians, and recently Allan and Baylor¹² presented evidence to substantiate that position.

In reviewing the several studies made on the relationship of the tonsils to rheumatic disease in children it becomes evident that the surgical treatment of the tonsils, regardless of the age of the child, offers no certainty in preventing this infection and apparently does not reduce the number of recurrences. The clinical improvement in many cases has justified the operation, and the somewhat meager statistical data at hand in the Rochester study suggests that fatal carditis was noted less frequently in the tonsillectomized group.

The incidence and the complications occurring in the common infectious diseases of childhood were studied

the nutritional development even if the other factors essential to good nutrition are assured a child.

Such disturbances as recurrent vomiting attacks and chronic anorexia are known to influence the development of the child unfavorably. The underlying causes of these manifestations are not always obvious. When they exist the tonsils are frequently incriminated,

TABLE 1.—Incidence of Recurrent Attacks of Acute Rheumatism with Reference to Removal of Tonsils in 439 Children Observed for Five Years

Age of Children at First Attack	Number in Whom First Attack Developed Before Tonsillectomy	Number Who Had Recurrent Attacks	Number in Whom First Attack Developed After Tonsillectomy	Number Who Had Recurrent Attacks
Under 5 years.....	36	11-31%	2	1-50%
From 5 to 10 years...	104	42-41%	22	10-45%
From 10 to 15 years..	151	30-33%	88	19-21%
From 16 to 17 years..	25	8-32%	11	4-36%

even before a careful search is made for other etiologic factors. Undoubtedly chronic infections in the tonsils can bring about these symptoms, for there is abundant clinical evidence that recurrent or cyclic vomiting is sometimes relieved after the tonsils of these children have been removed. Marked improvement in the appetite likewise has been known to develop when presumably infected tonsils have been removed. It does not follow, however, that tonsillectomy always assures a child freedom from the vomiting habit nor does the appetite promptly improve. A careful analysis of these complaints in a group of children before and after tonsillectomy showed that after tonsillectomy approximately 50 per cent were relieved of the attacks of periodic vomiting that had existed prior to the operation. In the case of anorexia that had been present for some time before a tonsillectomy was performed, somewhat less than 50 per cent showed improvement in appetite following the operation. In attributing the improvement to tonsillectomy one must not overlook the fact that such complaints as recurrent vomiting and anorexia disappear even when the tonsils are not removed. Certainly in some individuals diseased tonsils are the direct cause of these digestive complaints.

Impairment of hearing and irregularities in speech have been ascribed to obstructive lymphoid tissue in

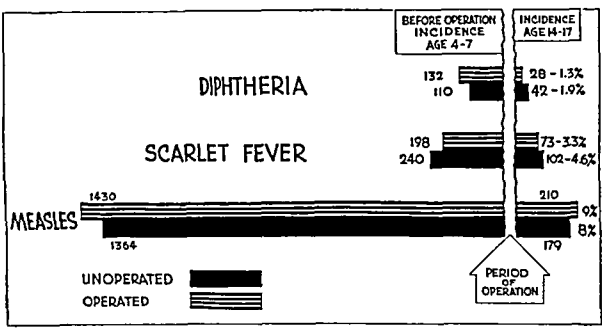


Chart 7.—Diphtheria, scarlet fever and measles before and for ten years after removal of tonsils of 2,200 children and for a similar period among 2,200 nontonsillectomized children.

in the tonsillectomized and nontonsillectomized groups. In pertussis the presence or absence of the tonsils made no difference. The same situation existed with measles. Diphtheria showed a lower incidence in the tonsillectomized children, but the incidence was low in both groups, probably owing to immunization. Scarlet fever occurred somewhat less often in the tonsillectomized children, but the difference was not significant. In a study of 267 scarlet fever patients in the hospital it was found that more complications developed in the children whose tonsils had not been removed.

The proper development of the child may be interrupted by recurrent infections or may be interfered with when normal physiologic processes such as nutrition, digestion, speech, hearing and mental development are impaired. There is abundant clinical and statistical evidence to show that either hypertrophied tonsils or infected tonsils may impair the child's nutrition. Following removal of the tonsils in these instances the nutrition of the child promptly improved. When, however, the procedure was applied to a large group of children on whom a prophylactic tonsillectomy had been performed, there was no evidence that the tonsillectomized children demonstrated a superior nutritional state. Sufficient evidence is available to show that chronically infected tonsils may definitely retard

TABLE 2.—Effect of the Tonsils on Outcome of Rheumatic Infection in 597 Children Followed for Ten Years

Tonsils	Number	Died	Recurred	No Recurrence
Remained in.....	156	13%	46%	41%
Out at 1st attack.....	187	7%	48%	45%
Out after 1st attack....	254	4%	44%	52%

the nasopharynx. Hearing defects other than those produced by infection in the middle ear may be due to lymphoid obstruction of the eustachian tube. The tonsils are seldom responsible for impairment of hearing. The adenoids frequently are the cause of trouble and removing them may promptly relieve this condition. Speech irregularities have been improved in cases in which hypertrophied tonsils and adenoids have been removed, but there is no evidence that the tonsils are a disturbing factor in any large number of children with speech defects.

12. Allan, W. B., and Baylor, J. H.: Bull. Johns Hopkins Hosp. 62: 111-123 (Aug.) 1938.

There is undeniable evidence that the child population of our country has experienced better physical development with fewer interruptions due to mild and prolonged illnesses in the last three decades. Not only has the infant mortality been materially reduced but fatal illness in children of school age is less likely to occur. It is true that this saving of child life and improvement in the general health of the child has come during the period of widespread surgical treatment of the tonsils. It has even been suggested that removing the tonsils in from 30 to 50 per cent of the urban children of our country has played a major part in attaining this favorable situation. One cannot, however, lose sight of the fact that notable advances have been made in the science of nutrition during this period. The application of these discoveries has contributed appreciably to improving the nutritional state of the growing child. Likewise in the fields of bacteriology and immunology advances have been made which have greatly reduced the hazards of certain diseases, notably diphtheria, syphilis and pertussis. Perhaps of even greater importance to the child has been the widespread application of public health procedures such as pasteurization of milk, the safeguarding of water supplies and the refrigeration of foods. Health education in the schools, by volunteer and official health agencies and the utilization of the press and the radio, has reached many children and parents who formerly were kept in ignorance of the factors that safeguarded health. Due consideration must be given to all these contributing factors in assigning the reasons for the improved health of the children of America. Because of these various improvements in child care that have been made available during the last three decades, it becomes more difficult to assign to the tonsils the particular part that they play in the economy of the child.

CONCLUSIONS

The tonsils have assumed an important role in the economy of the child during the last thirty years. The beneficial results following tonsillectomy in selected cases inspired this procedure on a large percentage of children often without a good reason.

Follow-up studies on tonsillectomized and nontonsillectomized children were undertaken to show the trend of certain complaints over a ten year period in the two groups and to note the effect of the tonsils on the physical development of the child.

It was shown that markedly hypertrophied tonsils and tonsils that are repeatedly inflamed giving rise to attacks of tonsillitis and cervical adenitis frequently do impair normal physical development. When such a condition exists after the age of 4 years it is advisable to have the tonsils removed, with the expectation that at least 50 per cent of the children so treated will be materially improved.

Such infections as the common cold, otitis media, sinusitis and laryngitis may unfavorably influence the child's normal development. It cannot be demonstrated that the tonsils are often a causative factor in these infections; consequently tonsillectomy does not offer a solution for their eradication save in exceptional cases.

It could not be shown that the incidence of such diseases as bronchitis, pneumonia and tuberculosis was reduced in tonsillectomized children. The tonsils are not often responsible for pulmonary infections.

Rheumatic disease and nephritis constitute serious handicaps to a child's normal development. Recent studies show that the tonsils play a less significant role

in the causation and treatment of these diseases than was formerly supposed. However, a reduction in the number of throat infections following tonsillectomy has a beneficial effect in the rheumatic subject.

There has been a significant decline in the mortality and morbidity rate of children during the last three decades. There has also been an improvement in the physical development of children in America. The application of the new discoveries in the field of nutrition, immunology and sanitation has contributed much to this favorable situation. When proper consideration is given to these factors it is evident that the tonsils are not as great a menace to a child as has been frequently suggested.

There is substantial evidence that in about 20 per cent of the children the tonsils are either hypertrophied or diseased and therefore have an unfavorable influence on the physical development of the child. Such tonsils should be removed.

16 North Goodman Street.

RESULTS OF CONSERVATIVE APPLICATION OF X-RAY TREATMENT IN CHRONIC LEUKEMIA

A NOTE OF OPTIMISM

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Forkner¹ has written "It is now almost a hundred years since the classical description of leukemia yet today we know almost nothing about its cause or its specific treatment." The truth of this statement will be evident from even a brief review of the more recent literature on the subject or of almost any series of records of patients treated according to the customarily applied technics.

The rather general tendency toward pessimism on the part of the medical profession in respect to the possible benefits to be derived from treatment of a patient with leukemia has developed, and is perhaps in part justifiable, because of the ineffectiveness of therapy in the acute and atypical leukemias which is assumed to apply to all leukemias and because of the failure of statistical studies of case records to have demonstrated that the life span of the patient with chronic leukemia has been appreciably lengthened as the result of treatment. Although the measure of the value of therapy of an illness on the basis of its effect on duration of life has a dramatic appeal it may blind us to the importance of treatment, particularly of the patient with a chronic illness, in respect to his economic and social status, general health and comfort.

In 1924 Minot, Buckman and Isaacs² reported data which showed little difference between the average duration of life of seventy-eight patients with chronic myelogenous leukemia treated by x-ray irradiation and fifty not irradiated. The former group lived an average of 3.5 years after the first symptoms, the latter slightly

From the Medical Clinic of the Peter Bent Brigham Hospital. Dr. Merrill C. Sosman directly supervised the x-ray therapy, and Miss Isabel Howard made numerous blood counts.

Read before the Section on Pharmacology and Therapeutics at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.

1. Forkner, C. E.: *Leukemia and Allied Disorders*, New York, Macmillan Company, 1938.

2. Minot, G. R.; Buckman, T. E., and Isaacs, Raphael: *Chronic Myelogenous Leukemia: Age Incidence, Duration and Benefit Derived from Irradiation*, J. A. M. A. 82:1489 (May 10) 1924.

more than 3.0 years. In the same year Minot and Isaacs³ published similar data concerning chronic lymphogenous leukemia but found no essential difference in the average duration of life in irradiated and nonirradiated patients. A group of eighty patients composed of fifty irradiated and thirty nonirradiated lived an average of 3.45 years after the first symptoms. It was concluded that both groups were benefited symptomatically by irradiation, the myelogenous group benefiting by an average of 1.6 years of efficient life whereas in the lymphogenous group the efficiency of the patient was increased strikingly in only 10 per cent. The latter authors quote Klewitz and Schuster⁴ and Brandt⁵ as reporting the average duration of life in chronic lymphogenous leukemia to be about two years.

Hoffman and Craver⁶ reported the average duration of life after the onset of the disease to be 3.36 years and after the beginning of treatment 2.62 years for eighty-two patients with chronic myelogenous leukemia. These authors were, however, somewhat more optimistic in regard to the other benefits to be derived from x-ray treatment and concluded that "The actual duration of efficient life after beginning irradiation averaged 2.13 years, varying from eight months to 5.66 years. The radiation treatment causes an average increase of about ten months in the duration of efficient life—a period of efficiency and usefulness that the patient otherwise could not hope to enjoy."

Arendt and Gloor⁷ reported even more favorable results from therapy of both forms of chronic leukemia. The average duration of life in thirty-nine cases of chronic myelogenous leukemia was four years, and of even greater importance perhaps is the occurrence in their group of a greater number of patients living more than four years.

Although Allen and Dickey⁸ have not discussed duration of life, they have been greatly impressed with the possibility of improving the patient's general condition. Their attitude is well expressed in the following sentence: "Any procedure which will increase the length of a remission, raise the degree of the patient's efficiency during a remission or prolong useful life in myelogenous leukemia deserves consideration."

This small group of references to literature dealing with the effect of therapy on the prognosis in respect to prolongation of life and symptomatic improvement tells essentially the entire story of the results of the treatment of chronic leukemia to the present time. Treatment in myelogenous leukemia has been primarily that of periodic exposure of the spleen and (or) the long bones to rather massive doses of x-rays, except in the groups reported by Forkner and Scott⁹ and Arendt and Gloor,⁷ in which the use of arsenic was emphasized. Little originality has been shown in respect to the method of application of treatment and little effort has been made to keep the disease process under control. Arendt and Gloor⁷ have given arsenic in some form

more or less continuously between relapses, which were then controlled by x-ray therapy as the need arose. Allen and Dickey⁸ have emphasized the importance of following the patient's condition carefully by means of frequent analysis of the condition of the blood and by saliva leukocyte counts, but they state that, "As a general rule, a series of treatments should be initiated only when the patient's general condition is poor and his efficiency low." This method of determining the use of treatment has been subscribed to by Minot, Buckman and Isaacs,² Hoffman and Craver,⁶ Forkner¹ with reservations and Jackson,¹⁰ who states that treatment of chronic myelogenous leukemia should be withheld until such time as the patient's symptoms appear to call for alleviation. In discussing the treatment of chronic lymphogenous leukemia, Jackson¹⁰ makes the comment: "As with chronic myelogenous leukemia, irradiation of the spleen or chest, preceded by blood transfusions if there is a coexisting anemia of moment, is the treatment of choice. It is very questionable, however, whether there is any advantage in treating those patients who are symptomless. The details of the x-ray therapy should be left to the radiologist in charge . . ."

This attitude toward the use of x-ray therapy is that which has largely influenced the regulation of treatment up to the present time and which is probably largely responsible for the belief held by many clinicians that the patient with chronic leukemia is not in better condition with a low than with a high leukocyte count. It is quite obvious that with the method of therapy often employed such might be the case. Massive x-ray dosage is applied over the spleen at a time when the patient is weakened, often suffering from anorexia and nausea and with a high leukocyte count. The therapy may increase the anorexia and nausea, the leukocyte count may drop rapidly even to a subnormal level and the hemoglobin and erythrocyte levels may drop, which increases the feeling of weakness and malaise so that it may take days, weeks or even months to recover from the effects of treatment, at the end of which time and just when the patient has begun to feel fairly well his leukocyte count is again rising, symptoms returning and he is put through another third degree of treatment. And thus many of our patients go through a series of relapses and remissions feeling more disturbed than relieved by therapy, dreading each successive series of treatments more and more, frequently to the point of avoiding the physician's check-up until it is too late to hope for much benefit. The periods during which the patient experiences a feeling of well being of sufficient degree to allow the pursuit of normal activity are short and generally progressively shorter, and the periods of sickness during and following x-ray therapy either in or out of a hospital are discouraging and expensive ones. Exceptions to this course do occur. Spontaneous remissions of longer or shorter duration may be experienced by the patient with either form of leukemia with and without therapy, but these are not the rule and do not affect the course of the illness of the majority of patients.

With these facts in mind and after having observed the unfavorable general condition of a group of patients with chronic leukemia treated in the generally accepted manner, it seemed desirable to consider wherein this form of treatment was at fault and then to correct these faults as far as possible.

3. Minot, G. R. and Isaacs, Raphael: Lymphatic Leukemia: Age Incidence, Duration and Benefit Derived from Irradiation, Boston M. & S. J. 191:1 (July 3) 1924.

4. Klewitz, F. and Schuster, E.: Zur Prognose der Leukämie, Deutsche med. Wchnschr. 48:1003 (July 28) 1922.

5. Brandt, T.: Roentgen Ray Treatment of Chronic Leukemia, Norsk. mag. f. lægevidensk. 84:761 (Sept.) 1923; abstr. J. A. M. A. 81:1916 (Dec. 1) 1923.

6. Hoffman, W. J. and Craver, L. F.: Chronic Myelogenous Leukemia: Value of Irradiation and Its Effect on Duration of Life, J. A. M. A. 97:836 (Sept. 19) 1931.

7. Arendt, J., and Gloor, W.: Resultate der Röntgenbestrahlung bei chronischen Leukämien, Strahlentherapie 44:715, 1932.

8. Allen, K. D. A., and Dickey, L. D.: The Saliva Cell Count in Myelogenous Leukemia, Am. J. Roentgenol. 38:57 (July) 1937.

9. Forkner, C. E., and Scott, T. F. M.: Arsenic as a Therapeutic Agent in Chronic Myelogenous Leukemia, J. A. M. A. 97:3 (July 4) 1931.

10. Jackson, Henry, Jr.: The Leukemias, New England J. Med. 222:22 (Jan. 4) 1940.

The most obvious and serious fault appeared to be that of allowing the patient to develop repeated relapses during which the disease process has progressed, followed by intensive treatment at a time when the general condition is poor. The well treated patient with diabetes or pernicious anemia is not permitted to omit treatment until severe acidosis or relapse occurs but is maintained constantly in as nearly a normal condition as is possible. Why is it not equally logical to prevent relapses and to maintain as nearly as possible a normal condition for the patient with chronic leukemia? In order to accomplish this the patient is advised to report each month for a blood examination. If the leukocyte count shows a tendency to rise during successive counts or if it has reached a level of about thirty to forty thousand, one x-ray treatment is given.

consultation with the roentgenologist, but the patient's physician will constantly guide the course of therapy because the roentgenologist may not be equipped to do blood counts and may not be so familiar with the patient's general condition.

The size of the x-ray dose and the site to be treated offered another problem for consideration. Severe anorexia, nausea and vomiting frequently follow massive therapy applied over the spleen, to a mass of lymph nodes or over the chest, and yet a similar dose over the long bones was often less disturbing to the patient but the effect on the leukocyte count, mass of lymph nodes or spleen was essentially the same. It would appear to be logical therefore to avoid the disturbing upset of the patient by the use of smaller dosage, provided an equally good effect can be produced. By apply-

TABLE 1.—Data Concerning Seven Patients with Chronic Lymphogenous Leukemia Treated by Means of Small Doses of X-Rays Applied by the Spray Technic*

Patient	Age	Sex	Duration Since First				Basal Metabolic Rate	Complications	Cause of Death
			Symptoms		Diagnosis				
			Years	Months	Years	Months			
1. A. B.....	55	♀	12	—	9	—	— 1	Recurrent herpes	Pneumonia
2. P. K.....	63	♀	11	9	7	6	+ 2	Hypertension; arthritis	
3. J. C.....	49	♂	10	6	9	6	— 3		
							+13	Arthritis	
4. M. D.....	55	♀	5	—	4	—	—	Cardiac hypertension	
5. A. E. B.....	57	♀	2	6	1	6	+34	Pneumonia	
6. A. S.....	70	♂	2	—	1	9	—	Deafness	Hemorrhage
7. L. H.....	63	♂	1	9	1	7	—	Orchitis	

* An effort has been made to hold the leukocytes at low levels throughout the course of the illness.

TABLE 2.—Data Concerning Nine Patients with Chronic Myelogenous Leukemia Treated as Were the Patients of Table 1

Patient	Age	Sex	Duration Since First				Basal Metabolic Rate	Complications	Cause of Death
			Symptoms		Diagnosis				
			Years	Months	Years	Months			
8. N. J.....	51	♂	5	—	5	—	—	.....	Pneumonia
9. M. R.....	36	♀	4	9	4	3	+16	.....	Hemorrhage
10. A. L.....	49	♀	4	6	3	6	+52	Diabetes mellitus; hypertension	
11. J. T.....	33	♀	4	6	—	5	—	.....	Cerebral embolus
12. A. R.....	42	♀	4	—	2	—	+34	Pulmonary tuberculosis	Pulmonary tuberculosis
13. W. B.....	47	♂	3	6	3	6	—	Terminal diabetes mellitus	Cerebral thrombosis
14. J. S.....	59	♀	3	6	3	6	+17		
15. M. McG.....	65	♀	3	4	2	8	+68	Myocarditis	Not known
16. M. D.....	65	♀	3	3	3	3	+33	Hypertension; pneumonia; herpes zoster	Pneumonia

If the rise has been gradual the patient returns for a leukocyte count at the end of a week; if rapid or if the count has risen above about forty thousand a count is done on the day following treatment. If in either case the leukocyte level has not dropped sufficiently, another treatment is given. In each instance an effort is made by this means to maintain the leukocyte level as near normal as possible constantly and never to allow it to rise above forty thousand. X-rays applied in this way rarely produce distressing nausea and the patient's condition remains rather uniformly good except as it may be influenced by intercurrent infections or other complications. Care must be taken to avoid too great a drop in the leukocyte count as the result of overdosage with x-rays. This will rarely occur if each treatment is preceded by a leukocyte count, and if there is then any question with regard to the advisability of further exposure an interval of a few days or a week may be allowed, at the end of which another count is done. The exact treatment which is to be given will be decided in

ing this small dose over a large part of the body surface it was found possible to do this and thereby to avoid on most occasions the disturbing post-treatment effects. Mild anorexia and nausea have followed treatment of the very sensitive patient and on rare occasions of any patient, but a severe unpleasant or incapacitating reaction has rarely occurred. The use of small dosage and the application of the x-rays over the greater part of the body from a distance, so-called teleoroentgen therapy, have both been advocated previously and both are now being used for the treatment of leukemia in several clinics, but their value as opposed to the massive dose method has not been widely enough recognized and the method has not come into general use.

The principles here set forth for the treatment of the patient with chronic leukemia have been applied as far as possible to a small group of patients and the results as far as age, sex and duration of life is concerned are shown in tables 1 and 2. For comparison with the groups shown in tables 1 and 2 there is pre-

sented in tables 3 and 4 groups essentially similar but treated largely by massive dosage, periodically as symptoms of progression of the disease state indicated without the attempt at complete control of progress as in the two former groups. There is not a sharp line of distinction between the method of treatment or follow-up in certain individual cases in the two groups and one might question the decision to include them in one table as opposed to the other. For example, patient 6 included in table 1 lived on a farm in Canada which made it difficult for him to return sufficiently often for treatment to be given to maintain the blood in a satisfactory state. On the other hand his x-ray therapy was given in small doses over the entire body except

far more disturbing than the symptoms of the disease. Anorexia and mild nausea are almost constant during its use, severe nausea and diarrhea frequent occurrences. An example of its effect is found in a case that came to my attention after approximately three years of arsenic therapy with a high leukocyte count. Anorexia and mild nausea were present almost constantly during this time, the patient being scarcely able to eat a meal and having lost 40 pounds (18 Kg.) during the last year of treatment. Following a few x-ray exposures by the "spray" technic the leukocyte count dropped to a normal level, the patient's appetite improved immediately and he regained within a few months the 40 pounds lost. Solution of potassium arsenite may be of value

TABLE 3.—Data Concerning Ten Patients with Chronic Lymphogenous Leukemia Treated by Massive Doses of X-Rays at Intervals for Control of High Leukocyte Counts and Symptoms Produced by Progression of the Disease

Patient	Age	Sex	Duration Since First				Basal Metabolic Rate	Complications	Cause of Death
			Symptoms		Diagnosis				
			Years	Months	Years	Months			
17. V. A.....	59	♀	9	—	9	—	—	.....	Not known
18. K. H.....	68	♀	4	10	4	10	—	.....	Not known
19. C. G.....	70	♀	4	6	4	3	— 3	Herpes zoster	Not known
20. A. G.....	56	♀	4	—	4	—	—	Pneumonia	Not known
21. C. P.....	48	♂	3	6	3	3	+33	Severe anemia	Leukemia; hemorrhage
22. G. S.....	61	♂	2	9	2	3	—	Herpes zoster; hydro- thorax	Leukemia
23. I. S.....	65	♂	1	9	1	6	+23	.....	Not known
24. S. G.....	54	♀	1	5	1	4	+48	Hydrothorax; severe anemia	Not known
25. D. C.....	68	♂	1	2	—	2	+19	.....	Leukemia
26. J. C.....	46	♂	1	—	1	—	—	Severe anemia	Not known

TABLE 4.—Data Concerning Eleven Patients with Chronic Myelogenous Leukemia Treated as Were the Patients of Table 3

Patient	Age	Sex	Duration Since First				Basal Metabolic Rate	Complications	Cause of Death
			Symptoms		Diagnosis				
			Years	Months	Years	Months			
27. W. McG.....	35	♂	4	4	2	4	—	.....	Not known
28. A. P.....	37	♂	3	6	2	6	—	Cardiac	Pulmonary congestion
29. H. L.....	21	♀	3	—	2	—	+33	Pregnancy	Not known
30. J. O.....	32	♂	2	11	2	10	—	Extraction of 2 abscessed teeth	Not known
31. A. B.....	60	♀	2	10	2	10	—	Mild diabetes	Coronary infarction
32. A. G.....	51	♀	2	8	2	8	+29	Hypertension; mild diabetes	Not known
33. E. G.....	73	♀	2	7	2	3	+54	Herpes zoster	Not known
34. L. S.....	53	♀	2	—	1	9	+33	Extraction of 8 teeth	Not known
35. W. B.....	24	♂	2	—	1	2	—	Exposure to benzene fumes	Pneumonia? embolus, pulmonary?
36. A. B.....	59	♂	1	6	1	6	+36	Extraction of 2 teeth	Not known
37. G. D.....	33	♂	—	9	—	4	+40	Healed pulmonary tuber- culosis	Multiple infarcts and thromboses

for two exposures to the cervical region at a time when the glands in this region were greatly enlarged. His death followed a severe hemorrhage from the gastrointestinal tract. This occurred during the middle of winter, 20 miles from his physician, who found it impossible to give him a transfusion of blood. Even though he was then 72 years of age, life might have been prolonged had circumstances been different.

Arsenic in the form of solution of potassium arsenite has been used from time to time in several of the group of patients with myelogenous leukemia of table 4. The effect has been to decrease the leukocyte count from the height of the peak during relapse, as was shown to be possible by Forkner and Scott,⁹ but there has been no evidence that it is possible to maintain the leukocyte count at a low level for a longer period of time than is the case following x-ray exposure. The most striking effect of the arsenic has been to upset the patient to such an extent that the treatment was

for the patient who does not have access to x-ray therapy but is probably less desirable than x-rays when this form of treatment is available.

In practically all instances, the patients listed in tables 1 and 2 have had leukocyte counts done frequently and an effort has been made to control these levels and the patient's general condition by x-ray treatment at intervals as indicated. Each treatment, with rare exceptions, since early in 1934 has been applied over the entire body, alternately front and back, supplying about 50 to 60 roentgens per dose. In general the treatment may be described as follows: 200 kilovolts, 100 cm. distance, 0.5 mm. of copper filter, spray technic.

Data concerning seven patients with chronic lymphogenous leukemia treated in the approved manner are shown in table 1, and concerning ten patients by the older method in table 3, a total of seventeen. Data concerning nine patients with chronic myelogenous leukemia treated in the approved manner are shown in

table 2, and concerning eleven patients by the older method in table 4, a total of twenty. The number of cases reported in any of the groups is too small to allow the data to be considered statistically, and as this report is not concerned with the analysis of leukemia in general they will not be discussed in detail. It is of

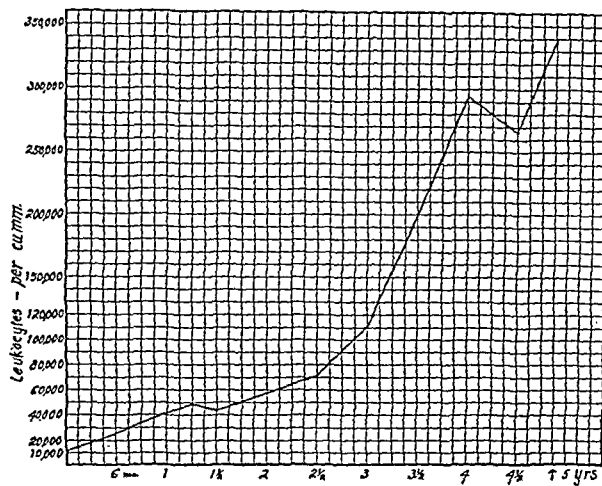


Chart 1.—Course of the leukocyte count in case 3 of table 1 during five years' observation before x-ray treatment was started.

interest to note, however, that myelogenous leukemia appeared at an earlier age in many instances than did the lymphogenous form; that of the seventeen lymphogenous eight were male, nine female and of the twenty myelogenous eight were male, twelve female; that the basal metabolic rate was increased more uniformly in those in whom the test was made in the myelogenous than was the case in the entire lymphogenous group; and that the most commonly observed evidences of the disease in its earlier stages were enlarged lymph nodes or a mass in the left abdomen; continuous or intermittent fever of unknown origin; anorexia, nausea or vague gastrointestinal disturbance; and definite, often striking loss of weight. Pulmonary tuberculosis pre-

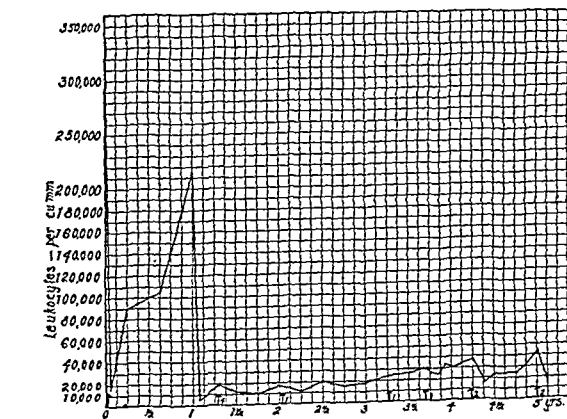


Chart 2.—Course of the leukocyte count in the same patient as of chart 1 is shown during five years of treatment with x-rays at intervals necessary to maintain the leukocyte level below about 40,000. The arrows indicate the time of x-ray treatment, the figure beside the arrow the number of exposures.

ceded the onset of leukemia in two of the myelogenous groups. A pneumothorax had been produced on the right side in patient 12 of table 2 but after four years of leukemia and shortly before death x-ray examination showed extensive involvement of the left lung. A postmortem examination was not made. Patient 37

of table 4 developed leukemia while in a tuberculosis sanatorium. At postmortem examination the tuberculosis was described as healed. Three instances of myelogenous leukemia were basophilic (table 2, cases 14 and 16; table 4, case 31). Uric acid determinations were made on the blood of four of the lymphogenous group with the results 3.3, 3.6, 5.2 and 5.7 mg.; and in five of the myelogenous group with the results of 3.4, 4.6, 6.0, 6.2 and 6.7 mg. per cubic centimeter.

It is difficult to compare the longevity of the two groups with either form of leukemia with each other or with the reports from the literature previously mentioned, but in general the showing of the group in table 1 is definitely better than that of those in table 3. The duration of life has been five years or longer in four patients of the first group, whereas only one of the second group lived five years or longer. Taking into consideration the fact that all but two of those in table 1 are living and in good condition at the present time, and allowing for the possibility that the disease may be present in mild form in some of these, the result compares favorably with that of previously reported groups. But even though one may question whether or not much has been gained in respect to length of life, the members of the group shown in table 1 have during

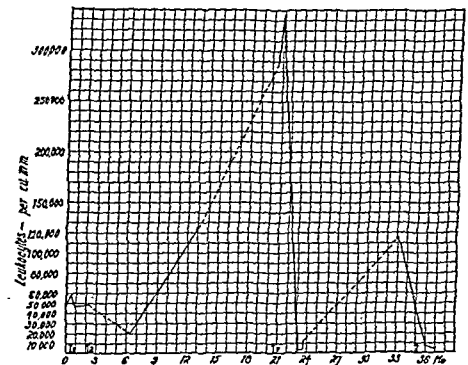


Chart 3.—Course of the leukocyte count in case 21 of table 3 during treatment at intervals by massive dosage of x-rays. The arrows and figures beside them indicate the time given and number of x-ray exposures.

life remained essentially well and able to carry on their daily duties without interruption except during the occurrence of a complicating illness. The female patients have continued with their household duties, patient 7 has continued actively with his ministerial duties and patient 3 has returned to his former occupation as a bus driver after having been relieved from duty for several years because of severe rheumatoid arthritis which antedated the leukemia. The arthritis has been completely controlled so that for three or four years hard labor has been possible without undue fatigue. The course of this patient's leukocyte levels during a period of five years before treatment was started is shown in chart 1 and for five years under treatment in chart 2. Since x-ray therapy was started the leukocyte level has been maintained below 40,000 by repeated exposures as shown in chart 2. In contrast to this patient's course is the irregular swing of the leukocyte levels of patient 21, table 3, whose clinical course was equally unstable (chart 3). The periods of remission with anything approaching normal vigor were short, a matter of a few weeks, rarely months, in the entire group shown in table 3.

The story of the two groups with myelogenous leukemia is not unlike that which has been described for the

lymphogenous groups except that the duration of life was not so long in either group (tables 2 and 4); but even so that of the patients of table 2 treated in the approved manner is longer on the average than that of the group in table 4 or of several of the series reported in previous literature. The course of the disease in the patients of table 2 has not in each instance been so smooth as that of the group with lymphogenous leukemia (table 1) and yet the majority have been remarkably well and practically throughout the duration of their life have carried on their normal duties except when handicapped by intercurrent disease. An example of the course of the leukocyte levels in a patient of this group is that of patient 13, table 2, shown in chart 4. Although this patient lived only three and a half years he continued actively at work as a model maker in a brass foundry and stopped only when a few days before his terminal illness he complained of severe abdominal and head pain. The urine suddenly became loaded with sugar and he became comatose and died a few days after admission to the hospital for the first time. At post-mortem examination cerebral thrombosis was given as the cause of death. In contrast to this patient's excellent health and control throughout life there is shown in

severe upper respiratory infection, herpes zoster and pneumonia prevented return at the proper interval on three occasions.

Patient 11 of table 2 received treatment only at the beginning of the last five months of her life, having had a spontaneous remission of four years' duration.

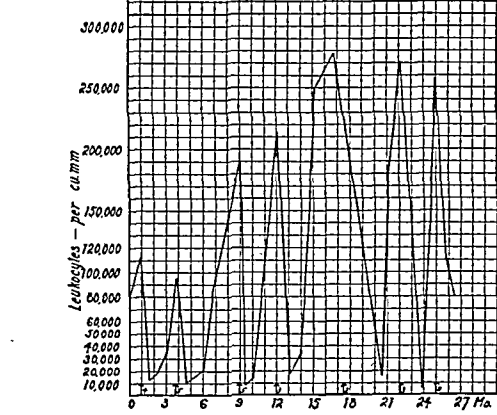


Chart 5.—Course of the leukocyte count in case 28 of table 4 as influenced by interval massive doses of x-rays. The arrows and figures beside them indicate the time given and number of x-ray exposures.

Although essentially well during the last five months she died suddenly on the fifth day following a minor operation, apparently from a cerebral embolus. A post-mortem examination was not made. Her case report possibly should not be included in either group but this is done in order that the series may be entirely consecutive and inclusive.

Isaacs¹¹ has suggested that the effect of x-ray irradiation is to be considered as a stimulative one, in small doses causing division and in large doses causing maturation and death of the leukocytes from senility. The results observed in the treatment by the spray technic in relatively small dosage as used in the cases reported in tables 1 and 2 confirms at least to some extent this concept (chart 6). It has been observed

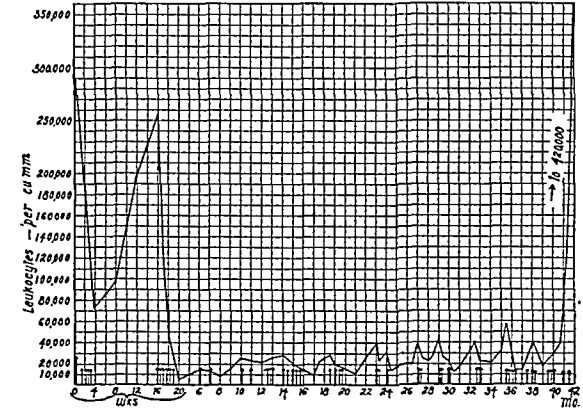


Chart 4.—Course of the leukocyte count in case 13 of table 2 as it was controlled by repeated small doses of x-rays. Each arrow indicates an x-ray exposure supplying approximately 50 roentgens applied by the spray technic.

chart 5 the pendulum-like rise and fall of the leukocyte levels of patient 28, table 4, who lived the same length of time from the onset of the disease but who was at almost no time well, was unable to resume any of his normal activities and spent much time in the hospital. As in the lymphogenous group, most of those of table 4 were more sick than well whereas most of those of table 2 lived a rather comfortable life.

The regularity of recurrence of the periods of marked increase in the leukocyte levels which commonly occurs in patients not completely controlled is well illustrated in chart 5. The interval between the peak of the rise in each relapse was approximately three months throughout the duration of the illness. The duration of this interval varies from patient to patient, but it is likely to remain rather constant in a given individual and may be influenced to some extent by the treatment used.

A six months interval between the several leukocyte peaks was observed in patient 16 of table 2 as shown in chart 6, in whom x-ray treatment was applied by the spray technic but who did not report for observation sufficiently often to allow the leukocyte level to be controlled. Three periods of rather serious illness including

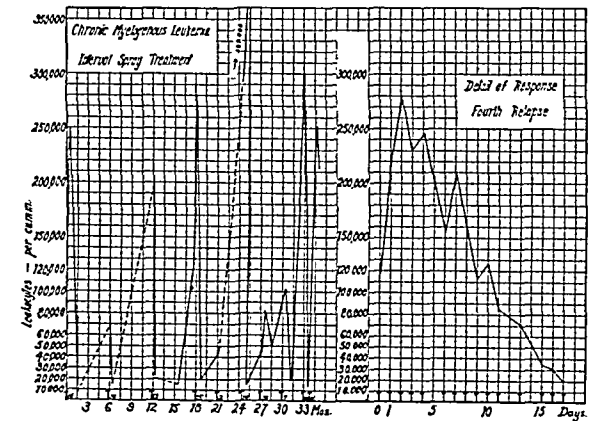


Chart 6.—Course of the leukocytic count in case 16 of table 2. X-ray treatment was given by the spray technic but control was bad because of the patient's failure to return for counts at proper intervals. In the right hand portion of the chart is shown the detail of the leukocyte response to therapy. Each arrow indicates an x-ray exposure supplying approximately 50 roentgens by the spray technic. The figures beside the arrows in the left hand portion of the chart indicate the number of exposures.

in these groups that the leukocyte level has tended to increase, often strikingly, during the few days following initial therapy after a relapse and that the per-

11. Isaacs, Raphael: Maturing Effect of Roentgen Rays on Blood-Forming Cells, Arch. Int. Med. 50:836 (Dec.) 1932.

centage of young or immature cells increases at first, to decrease gradually with a shift to more mature forms as the total leukocyte count drops to a near normal level. In several cases in which the leukocyte counts reached entirely normal levels the differential counts failed to show any immature, although some young forms. With repeated small dosage given as the levels tended to rise, the differential count has in many instances remained remarkably near normal for long periods of time. The nature of the response of the leukocytes to small x-ray dosages and the fact that it is possible to maintain them rather constantly at low levels with repeated exposures to small quantities suggests that chronic leukemia results from a deficiency of some substance necessary for maturation and (or) origination of leukocytes much in the same manner as pernicious anemia results from a deficiency of an antipernicious anemia factor. The deficient factor in leukemia is supplied in some manner by the x-ray exposure in small dosage, probably less satisfactorily by large dosage, which may also act to destroy cells. No doubt there is some more satisfactory means of supplying the "antileukemia" factor than by x-rays which may in themselves injure tissue. Future work should supply this substance, which will probably not be in the nature of benzene or its derivatives, the use of which is to be discouraged because of their known toxic effects, perhaps at times actually precipitating the disease state.

Another point of some interest in these patients is that in case 35, table 4, the leukemia developed after a period of definite exposure to benzene fumes. Cases similar to this have been reported by several authors previously. Two patients had been exposed to and felt keenly aware of the presence of illuminating gas fumes. Patient 13, table 2, worked for several years closely exposed to gas fumes and patient 14, table 2, had noticed leakage of gas from a kitchen range and had become acutely ill from this on several occasions. Several members of both groups had been exposed to some leakage of gas but the majority of patients who have come under my observation showing a leukemia-like blood picture, which might be interpreted as resulting from exposure to either illuminating gas or benzene fumes, have had a more acute course. It is possible that persons highly susceptible to benzene fumes may get sufficient exposure from traces of benzene in illuminating gas to develop the several evidences of disturbance in the blood which may follow exposure to higher concentrations. Further study of the concentration of benzene in canned foods and developed in limited areas from adhesive substances and in the illuminating gas from leaky fixtures may add to our knowledge of the etiology of leukemia and other blood dyscrasias of an atypical form.

SUMMARY

It is proposed that treatment of the patient with chronic leukemia be so applied and regulated that the disease state is kept constantly under control with avoidance of the severe relapses which so frequently occur. The method suggested is the frequent determination of the leukocyte level followed by x-ray exposure sufficiently often to maintain the level as near normal as possible. X-ray therapy is applied in small dosage by the "spray" technic in an effort to avoid severe reactions.

Data particularly recording the duration of life in two small groups of patients with chronic lymphoge-

nous and myelogenous leukemia respectively who have been treated in large part by the method described were compared with data concerning two similar groups treated by the more generally used interval, massive dose method.

Not only is there suggested some advantage in respect to longevity in the former groups as opposed to that of the latter, but the general health and economic efficiency of the patients of the former has been strikingly better throughout the duration of the illness than has been the case in the groups treated by the older methods.

311 Beacon Street.

ABSTRACT OF DISCUSSION

DR. IRVING S. WRIGHT, New York: The chairman would like to ask whether any thought has been given to estimating how long the average patient has the disease before it is discovered. An answer to this question would have to depend on careful histories of individuals who had had repeated blood counts and physical examinations for other causes but which were negative for leukemia so there could be some estimation as to how long the disease was present, or at least when the patient was last known to be normal. I think that might influence to some degree statistics as to years that the patient lived, although it would be a factor that would be constant in both of Dr. Murphy's series.

DR. PAUL REZNIKOFF, New York: I do not see how one can tell how long a patient actually has had leukemia when we know how often leukemia is diagnosed in a routine examination. In fact, very often the patient shows a large spleen that he never suspected. One can determine how long a patient has had symptoms from the time he began his symptoms to the time one saw him and made a diagnosis of leukemia. I feel that most of the patients with acute leukemia have had leukemia for a longer period than they actually admit being sick. Since we do not know the etiology we are forced to treat patients either according to symptoms or hematologic observations or, better, both. I have used a good deal of spray radiation for my patients and I agree with Dr. Murphy that in general it has given more satisfaction than the massive localized therapy. But I feel that, patients differing so, it is important to determine therapy not on the basis of any routine but on what the patient shows at the particular time and how the patient responds to the particular therapy at a given time. I have had some patients whom spray radiation has never helped and even made them sick, although the majority of patients have been able to stand spray radiation much better than they could spot or localized radiation. I have given about 50 roentgens as a rule. X-rays are toxic. One cannot give x-ray therapy over a long period of time without careful check of the patient and his blood count. I believe it is necessary to check not only the white blood cell count but also the platelets and the red cells and hemoglobin. I should like to ask Dr. Murphy whether in his so-called continuous therapy he has had patients who have developed anemia or thrombocytopenia with purpura which he might attribute to the method he used.

DR. CLAUDE E. FORKNER, New York: Leukemia is a disease of unknown cause and without satisfactory treatment. For ten years some workers have been trying to irradiate large areas of the body with so-called spray or teleroentgen therapy. This followed the observation of Levin in 1922 and Minot and Spurling in 1924 that the effect of irradiation on the blood is dependent to a large extent on the square surface of entry of the rays into the organism. It should not be forgotten that not only the favorable but also the unfavorable effects are dependent on these same factors. Spray irradiation is at times useful but it is also dangerous, and especially in leukemia it must be applied with caution. Single doses of 50 or 60 roentgens in some patients will bring about severe leukopenia and thrombocytopenia and will accentuate the anemia. There is marked variation in individuals in their response to a given dose of irradiation. The leukocyte count alone is not a safe guide to follow. The

thorough study of each patient as a whole over a reasonable length of time, taking into consideration all the available information in the history, physical examination and laboratory studies, provides a far better index for selection of cases for appropriate treatment than to use any one factor as a guide. In our present state of ignorance we are not justified in regarding leukemia as comparable to diabetes or pernicious anemia as mentioned in Dr. Murphy's paper, with regard either to its etiology or its treatment. Dr. Murphy has stressed an important point which has been too little appreciated, namely that patients should not be permitted to suffer relapses of their disease if that can be prevented. By carefully following the patient as a whole, his body weight, his general feeling of well being, the size of his spleen, his liver, his lymph nodes, his evidence of increased basal metabolism, leukocyte count, thrombocytes, erythrocytes and the degree and immaturity of his white cells, one can frequently forestall the relapse by appropriate treatment. This has long been the method of choice. I cannot agree with Dr. Murphy that the most striking effects of treatment with arsenic are to upset the patient. Solution of potassium arsenite (Fowler's solution), when given properly, almost without exception is a valuable therapeutic agent in chronic myelogenous leukemia. Solution of potassium arsenite must be given well diluted in fruit juice and must be given immediately after meals. The initial dose should be about 4 or 5 minims (0.25-0.3 cc.) three times daily, gradually increasing to an effective dose.

DR. H. J. ULLMANN, Santa Barbara, Calif.: As a radiation therapist it is gratifying to hear for the first time an internist say that one should control the radiation treatment of leukemia by the blood count and to treat with small doses rather than by massive doses the patient's symptoms. In lymphatic leukemia I depend more on the differential rather than on the total count because of the necessity for maintaining a sufficient number of polymorphonuclears to combat infection. In myelogenous leukemia the total count is of more importance with regard to reinstituting treatment, and frequently when the count is up, but there are no symptoms, such as an enlarged spleen or symptoms of discomfort, the judicious use of solution of potassium arsenite will carry the patient for months before further irradiation is needed. Many radiation therapists consider it wrong to give large or massive doses, and I feel that no dose should be given that makes the patient the least bit sick. I do not know whether general body irradiation is better than local, but I do know that in no instance should large doses be given. The basic dose that I use is from 50 to 100 roentgens measured on the skin, which is approximately 70 per cent of what is usually referred to in the literature as measured in air. The repetition of the dose, daily or otherwise, depends entirely on the blood count, which is made daily at first when the treatments are given daily, and, of course, the blood count must be made at the same time of day. No treatment is repeated until the count is known. I often find it difficult to get cooperation from an internist after the first course of irradiation because he turns to his textbook and if the count is not up to ten or fifteen thousand he does not refer the patient for either irradiation or consultation. The regulation of the dose and its timing should be in the hands of a radiation therapist, for if he is not a clinician he is not fit to treat with radiant energy. I do not think that, properly used, radiant energy is toxic in these cases. It can be used indefinitely if the doses are small enough. I have never seen thrombocytopenia caused by proper radiation therapy. If it did occur from such a cause I should consider that there had been gross overdosage. I did not know that any one believed one could produce an effect on the blood alone by irradiation. I have irradiated the blood in a rabbit's blood vessel, thoroughly isolated from the body, with enormous doses without producing any change in the cell count.

DR. WILLIAM P. MURPHY, Boston: Dr. Reznikoff asked with regard to my experience in respect to the development of anemia and thrombocytopenic purpura in the patients treated by means of small doses of x-rays applied by the "spray technic." There has been no greater tendency to the development of anemia in this group than in those patients receiving roentgen therapy in larger dosage over a more limited area. The erythrocyte and hemoglobin levels have in most instances been higher following treatment than they were preceding it; but this cannot

be interpreted too broadly because the development of anemia in the patient with leukemia varies greatly and is governed by factors not entirely dependent on x-ray exposure. Purpura has not developed following therapy in any of this group of patients. Severe and alarming leukopenia has developed in two or three patients treated in the hospital but not under my immediate observation. This condition is evidence of an overdosage of x-rays. If not extreme the leukocytes will gradually increase in numbers without specific therapy. If the leukopenia is severe, transfusions will usually keep the patient out of danger until regeneration occurs. One point which has been reemphasized and which applies in principle to the control of most chronic illnesses is that the best results will be obtained only with a careful and critical evaluation of the patient's entire blood and clinical picture throughout the period of illness.

HUMAN SERUM TRANSFUSIONS

SIDNEY O. LEVINSON, M.D.

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AND

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CHICAGO

Moon¹ states that shock is "a circulatory deficiency, not cardiac or vasomotor in origin."

One of the fundamental requirements in combating shock is restoration and maintenance of adequate volume of the circulating blood. Whether shock is primary or secondary, whether due to hemorrhage, trauma or toxic substances, it is generally believed that there is a resultant diminished circulating blood volume and decreased peripheral blood flow. In the presence of dilated and more permeable capillaries, there is progressive blood stasis and subsequent loss of plasma into the tissue spaces. Thus the oxygen supply to the tissues is greatly curtailed. This course of events is progressive unless interrupted. One means of interrupting this sequence is to administer sufficient fluid to restore adequate circulating volume and improve the rate of blood flow. Furthermore, it is imperative that the vicious circle of progressively diminishing blood volume and blood flow and tissue anoxia should be interrupted as early as possible before severe and irreversible damage to the tissues occurs.

In the past, the most common fluids employed to combat shock have been crystalloid solutions such as dextrose, saline-dextrose and Ringer's solution. As was demonstrated in a series of experiments reported previously,² the crystalloid solutions are of only temporary beneficial effect. They increase blood volume but, owing to the fact that they do not remain in the circulation, their beneficial effects are only transient. When such crystalloid solutions diffuse out of the abnormally permeable capillaries the increasing edema is decidedly harmful. Acacia solution has been employed because this material remains in the circulation owing to its colloidal properties, but immediate and delayed reactions³ contraindicate its use.

Read before the Section on Pathology and Physiology at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

From the Samuel Deutsch Serum Center, Departments of Obstetrics and Gynecology, and the Department of Gastro-Intestinal Research, Michael Reese Hospital.

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2. Levinson, S. O.; Neuwelt, Frank, and Necheles, Heinrich: Human Serum as a Blood Substitute in the Treatment of Hemorrhage and Shock, J. A. M. A. 114: 455 (Feb. 10) 1940.

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and sustained the blood pressure until blood transfusions were started.

It must be pointed out that in these three instances any delay before treatment, even of only fifteen or thirty minutes, might have been fatal. Such delay is unavoidable with the use of whole blood. This is true even when an institution has a blood bank, because before preserved blood can be administered the patient's blood

fusion with a rise in blood pressure, slower and fuller pulse and improvement in the general condition.

CASE 4 (chart 3).—F. B., a secundigravida-secundipara aged 29, in the service of Dr. Julius Lackner, had had a classic cesarean section performed for complete abruptio placentae in 1936. On Feb. 20, 1940, a low cervical cesarean section was performed. After extraction of the baby 1 cc. of solution of posterior pituitary was injected into the myometrium in order

TABLE 2.—Summary of Results of Serum Transfusion in Other Conditions

Case	Age, Yrs.	Diagnosis	Indications for Serum	Laboratory Data	Amount of Serum	Response to Serum	Other Treatment	Comment
Shock (not associated with hemorrhage)								
17	44	Carcinoma of rectum	Resection of rectum; operative shock	Blood pressure fell from 130/86 to 50/40	500 cc.	Prompt; progressive rise in blood pressure	Intravenous fluids	Good operative recovery
18	23	Carcinoma of breast	Radical mastectomy; operative shock	.....	500 cc.	Prompt; improved circulation	.....	Good operative recovery
19	4	Congenital dislocation of hip	Open reduction; operative shock	Pulse and blood pressure imperceptible	250 cc.	Prompt; blood pressure rose to 85/55	Intravenous fluids	Delayed recovery; streptococcal septicemia
20	33	Multiple contusions, lacerations and fractured ankle following 45 foot fall	Traumatic shock	.....	400 cc.	Prompt; recovery from shock	General	Uncomplicated recovery
21	21	Acute inversion of uterus	Visceral and operative shock	Blood pressure fell from 150/70 to 65/40	260 cc.	Gradual improvement	Stimulants; blood transfusion and fluids	Uncomplicated puerperium
22	36	Vaginal hysterectomy for menometrorrhagia	"Pituitrin shock" (1 cc. in myometrium)	Pulse and blood pressure imperceptible	400 cc.	Prompt improvement	Blood transfusion and dextrose intravenously	Uncomplicated recovery
23	29	Term pregnancy; previous classic cesarean section	"Pituitrin shock" (1 cc. in myometrium)	Pulse and blood pressure imperceptible	500 cc.	Prompt recovery, although improvement noted when serum started	Blood transfusion 4 days later	Uncomplicated recovery
Hypoproteinemias								
24	49	Starvation due to cardiopasm with nutritional edema and polyavitaminosis	Inadequate oral protein intake	Serum protein 3.8 Serum albumin 2.6 Serum globulin 1.2	110 cc. (4 × concentrated) 100 cc. (4 × concentrated)	Rise of serum proteins to 5.7 with diuresis and weight loss	Parenteral vitamin therapy; general supportive, antispasmodics	Gradual recovery
25	2½	Nephrosis	Low blood protein and marked albuminuria	.....	500 cc. in 5 divided amounts	Questionable	Diuretics; general supportive	Improved
26	52	Acute and chronic hepatitis	Edema; low blood protein	Serum protein 5.5 Serum albumin 2.3 Serum globulin 3.2	1,500 cc. (divided doses over 2 weeks)	Temporary improvement	Blood transfusions; supportive, dextrose intravenously	Died; no reaction
27	43	(Idiopathic?) embolic occlusion of right iliac artery	Prolonged septic course; low serum protein and generalized edema	Serum protein 5.5 Serum albumin 2.6 Serum globulin 2.9	500 cc.	Increased urinary output and diminished edema	Amputation following embolectomy; 4 (500 cc.) blood transfusions	Eventual recovery
28	1½	Ruptured appendix and generalized peritonitis	Protein loss from draining wound	.....	250 cc. (2 ×)	Cannot evaluate	Surgery; blood transfusions	Died 2 weeks postoperatively; no reaction
29	66	Gastro-enterostomy for old duodenal adhesions (postoperative)	Very low blood protein	Serum protein varied from 4 to 5.8	5,000 cc. (over 24 days)	Cannot evaluate	2,000 cc. blood (over 24 days)	Died; general peritonitis, bronchopneumonia; no reaction
30	2	Nephrosis	Low blood protein; albuminuria	Serum protein 4.3-4.8	Varying amounts of human serum; 4 × concentrated serum; human plasma	Increased urinary output; diminished edema	Diuretics, supportive	Response to whole serum equal to any other therapy; no response when febrile; no reaction
Burns								
31	5	2d-3d degree burns of 30 per cent of body surface	Plasma loss; shock	.....	100 cc. (4 × concentrated) and repeated	Good	Blood transfusions; gentian silver nitrate spray to burn; fluids	Prolonged septic course; good recovery; no reactions
32	27	2d-3d degree burns of 75 per cent of body surface	Plasma loss; shock	.....	100 cc. (4 × concentrated) 2 ×	Cannot evaluate	Tannic silver nitrate spray; two blood transfusions; fluids	Complicating bronchopneumonia; died; no reactions
33	17	2d-3d degree burns of 60 per cent of body surface	Plasma loss; shock	.....	1,000 cc. many hours later	Cannot evaluate	.....	Died within 24 hours; no serum reactions

must be typed and a compatibility test performed. Serum is kept on hand in the operating room and in the labor rooms, and no delay is encountered in its administration.

SHOCK NOT ASSOCIATED WITH HEMORRHAGE

The group of shock not associated with hemorrhage comprises seven cases, four associated with surgical procedures, two following the administration of solution of posterior pituitary injected into the myometrium during surgery and one due to trauma (table 2). In all instances the patients who had every clinical evidence of shock promptly responded to the serum trans-

fusion with a rise in blood pressure, slower and fuller pulse and improvement in the general condition. Within a few minutes the blood pressure and pulse became imperceptible. Two hundred and fifty cc. of physiologic solution of sodium chloride was administered, from which there was no apparent beneficial effect. Then 500 cc. of pooled human serum was injected. Following this the blood pressure was 102 systolic, 50 diastolic and the pulse 140 and of good quality. The blood pressure continued to rise and one hour later was 130 systolic, 90 diastolic. On the fourth postoperative day 500 cc. of citrated blood was given, following which a generalized urticaria developed. This was relieved by epinephrine. On the tenth postoperative day 0.1 cc. of dilute solution of posterior pituitary was injected intradermally; a marked erythematous pseudopodial reaction followed.

We are aware that most patients recover spontaneously from "pituitrin shock." However, it is a sound surgical principle to institute measures to combat shock when it develops from any cause. This case is particularly interesting since an allergic reaction to whole

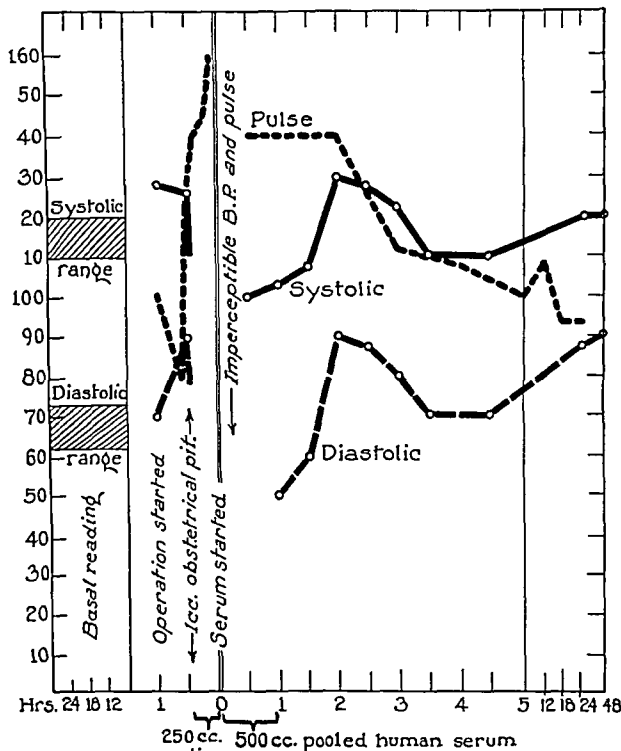


Chart 3 (case 4).—Serum transfusion for shock following solution of posterior pituitary during cesarean section.

blood developed, whereas there was no reaction to the serum infusion.

These patients were not in as critical a condition as those in the hemorrhage and shock group, and it is probable that recovery would have occurred without serum transfusion. However, at the time these patients were in shock restorative measures were deemed necessary.

HYPOPROTEINEMIA

Seven patients received serum transfusions for the treatment of hypoproteinemia. In two cases this condition was associated with nephrosis in children, and the effects of serum transfusions were variable (table 2). In three instances hypoproteinemia was associated with septicemia, and serum transfusion apparently was beneficial although in two the course was ultimately fatal. In one instance the hypoproteinemia was associated with extensive damage of the liver and kidneys, and here likewise serum transfusion seemed of temporary benefit. Case 5, reported briefly, is of particular interest.

CASE 5 (chart 4).—P. DeV., a woman aged 49, in the service of Dr. I. I. Ritter, had suffered from "stomach trouble" for from fifteen to eighteen years. She had not sought medical advice and for the past two or three years had existed entirely on cream soup, broth, custard, jello and coca-cola. Examination and extensive study established the following diagnosis: cardio-spasm with esophageal dilatation; starvation with profound nutritional edema; polyavitaminosis, particularly B and C, and hypoproteinemia.

Treatment consisted of a high caloric diet, large amounts of vitamin preparations administered orally and parenterally, and antispasmodics. Oral protein intake was very limited owing to

the cardio-spasm, and the serum proteins remained low. Therefore 100 cc. of four times concentrated (lyophile) serum, equivalent to 400 cc. of normal serum, was administered twice for the hypoproteinemia. Chart 4 shows the curves of the blood protein values, urinary output and weight with this treatment. It is seen that following the second injection of concentrated serum the blood proteins rose markedly, and there was a concomitant diuresis and resultant loss of weight. This patient was discharged markedly improved.

BURNS

Three patients suffering from burns of the body were treated with serum transfusion (table 2). Two of the patients suffered very severe and extensive burns involving approximately 75 per cent of the body surface, and both patients died. The third patient, who was admitted to the hospital following severe burns of approximately 30 per cent of the body surface, received both serum and blood transfusions and ultimately recovered, despite a prolonged septic course resulting from infection of the burned areas.

We feel that serum transfusions will prove a valuable adjunct in the treatment of severe burns. Our experience is limited at present, but it is reasonable that the plasma loss and hemoconcentration can best be overcome by serum replacement therapy.

MISCELLANEOUS

Fourteen patients were treated for a variety of conditions: cachexia due to infection, hemorrhage and shock with purpura haemorrhagica, exfoliative dermatitis, pneumonia, acute catarrhal jaundice, generalized septicemia and chronic blood loss (table 3). No definite conclusions could be reached as to the value of serum transfusion in these cases because none of them were carefully studied and the serum transfusion was employed as a supportive measure. One case deserves more than passing mention:

A child aged 9 years with septic mastoiditis could be given no blood transfusion owing to universal incompatibility, possibly resulting from intensive sulfanilamide therapy.⁴ Serum trans-

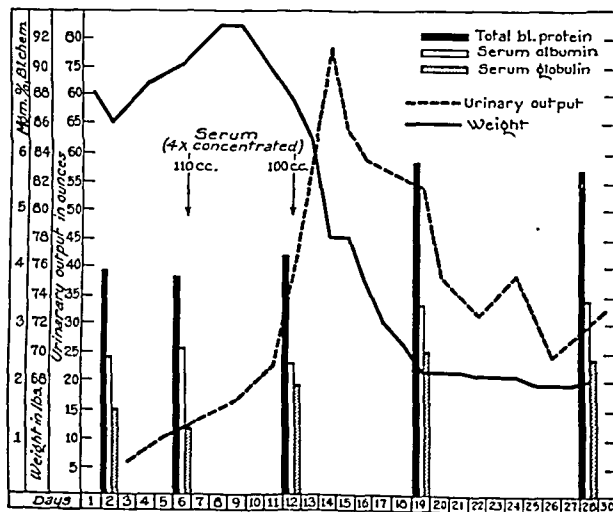


Chart 4 (case 5).—Serum transfusion for hypoproteinemia.

fusion was employed as an alternative measure, although blood would have been preferable because of the profound anemia associated with the infection. However, the child was definitely benefited by the serum transfusion, and after the infection was controlled the patient made an uneventful recovery.

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COMMENT

Serum transfusion as a blood substitute has been mentioned in the past.⁵ No practical use was made of this proposal until very recently. Brief reports⁶ have pointed out the merit of serum or plasma as a blood substitute. Our experience in the cases observed and reported in this paper completely confirms the evidence brought out in animal experiments⁷ that serum is an adequate blood substitute in shock. It appears that serum is an effective agent in many conditions in which blood transfusion would ordinarily be employed, with the exception of those conditions in which extensive loss of red blood cells occurs. Even in acute hemorrhage serum is a valuable temporary and intermediate treatment until blood can be secured, since it maintains circulating volume, thereby sustaining blood pressure and combating shock, anoxia and acidosis. The advantages of serum have previously been enumerated but can be summed up in the statement that serum can be prepared in very large amounts, can be stored over a long period of time without deteriorating and

sided subsequently. No reaction of a pyrogenic nature or blood group incompatibility was observed.

It is important to point out that the preparation of serum requires scrupulous care and meticulous technic. Many reports¹⁰ on serum prepared by trained personnel affirm the safety and innocuousness of this material. On the other hand, improperly prepared serum has been known to cause severe and even fatal reactions.¹¹

There are no great differences between plasma and serum as transfusion fluids. Essentially, freshly prepared plasma is serum plus fibrinogen, thrombin and one fifth dilution with 2.5 per cent sodium citrate solution. In our experience plasma cannot be kept over a long period of time because fibrinogen gradually precipitates out in the form of fibrin veils and granular precipitate and requires filtration or centrifugation and clearing before administration. After most or all of the fibrinogen has precipitated out, the solution consists essentially of serum diluted with sodium citrate. If the original intention of the laboratory is to prepare either serum or plasma, we believe that the former is prefer-

TABLE 3.—Summary of Miscellaneous Cases Treated by Serum Transfusions

Case	Age, Years	Clinical Diagnosis	Indication for Serum	Amount of Serum	Comment
34	10	Acute catarrhal hepatitis	General supportive regimen	250 cc.	Recovered
35	13	Banti's syndrome, pneumococemia, amebic dysentery	Generalized edema; ascites	500 cc.	Death; necropsy; Laënnec's cirrhosis
36	4	Influenzal meningitis	General supportive regimen	250 cc.	Death
37	9	Otogenic sepsis	Universal blood incompatibility	250 cc.	Progressive recovery
38	49	Streptococic lobar pneumonia	Nonspecific supportive therapy	500 cc.	Death
39	48	Severe exfoliative dermatitis (etiology ?)	Marked toxicity; cachexia	1,550 cc. in divided amounts over 2 mos.	Temporary improvement; died after 5 months
40	54	Ulcerative colitis	Cachexia; general supportive	250 cc.	
41	54	Gastric ulcer with obstruction; subtotal gastrectomy	Postoperative supportive treatment	500 cc.	
42	32	Thrombocytopenic purpura; intracranial hemorrhage	Moribund	700 cc.	tive day Death
43	47	Peptic ulcer with hemorrhage; heart failure	Elevated nonprotein nitrogen; cachexia	500 cc.	Temporary clinical improvement; subsequent death
44	?	Hypertensive encephalopathy	Inadequate protein intake	250 cc.	
45	58	Carcinoma of rectum; abdominoperineal resection	General supportive; cachexia	500 cc.	Extensive necrosis of abdominal wall; progressive recovery
46	4	Medulloblastoma of cerebellum	Cachexia	400 cc.	Death
47	42	Generalized peritonitis following ruptured appendix	Postoperative cachexia; blood transfusion reactions	2,000 cc. over 7 days	Improved; reaction to serum consisting of immediate pain, burning, swelling and redness along course of vein

can be shipped and handled easily. A factor of utmost importance is that serum transfusion can be given without preliminary typing and compatibility tests. The latter consideration has been discussed in a recent publication⁸ in which it is shown that agglutinin in the patient's serum absorbs infused agglutinins and inhibits their action on the patient's red blood cells. Furthermore, a low agglutinin titer serum can be prepared by pooling a large number of serums of varying blood groups.

Objection has been raised to the use of serum on the grounds that severe reactions are encountered.⁹ In the cases reported here, a reaction was observed in only one instance. This consisted of local pain along the course of the vein into which the serum was being injected, followed by redness and swelling which sub-

able because after its preparation and clarification by filtration it can be stored indefinitely, retaining its clear state. However, if a laboratory employs the plasma from outdated preserved blood, the supernatant plasma can be withdrawn and if not used within a short time it can subsequently be filtered to remove the fibrin precipitates and then stored for a long period of time. Adequate sterility tests must be performed whenever cloudy plasma is employed.

Flasks of serum are now being stored in labor rooms, operating rooms and first aid stations for immediate use in obstetric and surgical emergencies. The use of serum will increase the efficiency and adaptability of any hospital blood transfusion service, and outdated preserved blood need not be discarded. In the light of the foregoing discussion it is unnecessary to point out the great advantages of serum in the medical military service.

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11. Sudden Death After Injection of Human Serum, *Current Comment*, *J. A. M. A.* **103**: 192 (July 21) 1934.

SUMMARY

1. Forty-seven patients suffering from a variety of conditions received human serum transfusions.

2. Patients suffering with shock from hemorrhage and other causes, hypoproteinemia or burns were definitely benefited by serum transfusion, and in a number of instances a dramatic recovery was observed.

3. The supply of serum is limited only by the supply of blood, and once it is prepared it can be preserved for a long time.

4. Serum transfusions may be given without preliminary laboratory typing and compatibility tests.

5. No reactions were observed or need be anticipated if serum is properly prepared. However, meticulous care must be taken in the preparation of serum.

6. Serum is preferred to plasma because it does not contain sodium citrate and because fibrin precipitates do not occur.

7. Serum is a valuable adjunct to any hospital or military transfusion service.

Twenty-Ninth Street and Ellis Avenue.

ABSTRACT OF DISCUSSION

DR. JOSEPH A. WAGNER, Bryn Mawr, Pa.: In our experience at the Bryn Mawr Hospital, reactions frequently follow the intravenous use of serum. Serum is the liquid phase of the blood separated after clotting has taken place, whereas plasma is the liquid phase of the blood separated without clotting. There are profound differences between the two substances which have been brought out in a number of ways. These may be grouped as follows: First, reactions following administration of fresh serum or serum preserved by drying from the frozen state. These have been reported in animals by Ravdin, Levinson and Freedman and their co-workers and in man by Aldrich, Ravdin and their co-workers and by Strumia and me. On the other hand, plasma fresh or preserved by either refrigeration or drying from the frozen state has now been widely employed by a number of experimenters in animals without reaction and clinically by Elliott, Lehman, Saint Girons, Ravdin, Knott, Edwards and others and by our own group. We have had experience with the material for at least eleven years, during which time more than 1,200 intravenous administrations have been given under closely controlled conditions and in doses as large as 2,000 cc. in twenty-four hours without disturbance. As much as 9 liters was given to one patient in eleven days. When one compares the electrophoretic pattern of serum and plasma as determined by the Titellus apparatus by Dr. Scudder, gross differences are at once appreciated. The cutaneous reactivity of animals and man to minute intradermal doses of serum and plasma offers a striking difference. When plasma is administered subcutaneously or intramuscularly, the rate of absorption is comparable to that of physiologic solution of sodium chloride. When serum is injected the rate of absorption is much slower. All these arguments point to a profound difference between serum and plasma and suggest, as Brodie first observed in 1900, that in the process of clotting a change is brought about in the serum which makes it toxic. Plasma has other advantages besides that of complete freedom from reaction. It is first of all more readily obtained than serum; second, it gives a greater yield of the liquid phase; finally, in the institutions where blood banks are established it is a readily obtained by-product. While we agree that on the whole physiologic effect of fresh serum is comparable to that of plasma in the treatment of shock, the fact that plasma has mechanical advantages in separation and freedom from reactions when administered intravenously makes it the material of choice.

DR. SIDNEY O. LEVINSON, Chicago: It is surprising that the discussion does not involve the validity of the claim that human serum is a good substitute but rather focuses around the question of whether serum or plasma is superior. Such controversy appears relatively unimportant, because both answer the purpose of supplying a human colloid protein-containing fluid. I hold no brief for either serum or plasma. Where the latter is more

easily available and prepared (as in blood banks), plasma should be used; where the former can be properly and easily handled, serum is to be preferred. I protest emphatically that properly prepared serum is not toxic. Human serum has been used extensively in Illinois by thousands of physicians in the last ten years, and with the exception of occasional allergic reactions no ill effect has been experienced or reported. Toxic reactions, such as those reported by Dr. Strumia, have been conspicuous by their absence. The handling of clotted blood is different from that of citrated blood. The unfavorable laboratory and clinical results reported may well be due to the use of technic different from that employed successfully by the various serum centers throughout the country. Wide experience from all serum centers indicates that properly prepared serum is safe. I have no doubt that if plasma was improperly prepared it would not be innocuous. We are all aware of the fact that even a simple material like saline solution may cause severe reactions. Technic and care in preparation are of the greatest importance. In all other matters I agree with Dr. Wagner. Either serum or plasma, having the same essential properties, may be used to great advantage and with complete safety.

REDUCTION OF ELEVATED BLOOD
PRESSURE BY ADMINISTRATION
OF RENAL EXTRACTS

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BALTIMORE

J. R. WILLIAMS JR., M.D.

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T. R. HARRISON, M.D.

NASHVILLE, TENN.

A number of investigators have claimed beneficial results from the administration of renal extract. The earliest studies were those of Brown-Séquard and d'Arsonval¹ in 1892 and of Meyer² the following year. These authors reported that nephrectomized animals were improved by their crude extracts. More recently it has been stated³ that renal venous blood contains a substance which in animals causes diuresis, with reduction in the amount of sodium, chloride, potassium and urea in the blood. It has likewise been claimed⁴ that extracts of the kidney cause diuresis and reduction of blood pressure in patients with nephritis. These therapeutic claims have not been confirmed nor have they received any serious consideration by competent authorities for a number of reasons. In the first place the hypotensive action claimed for these extracts has not been demonstrated in hypertensive animals. Secondly, the clinical data have not been convincing. In most instances only one measurement of blood pressure has been reported prior to the administration of the renal extract. Since it is well known that striking variations in blood pressure occur in hypertensive subjects and since it is generally recognized that such patients usually have a higher blood pressure when first observed by a physician than when subsequently seen by the same

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From the Department of Medicine, Vanderbilt University School of Medicine, Nashville, Tenn., and the Department of Pharmacology and Experimental Therapeutics, Johns Hopkins Medical School, Baltimore.

Read before the joint meeting of the Section on Practice of Medicine and the Section on Pharmacology and Therapeutics at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

1. Brown-Séquard and d'Arsonval: *Compt. rend. Acad. d. sc.* **114**: 400, 1892.

2. Meyer, E.: *Arch. de physiol. norm. et path.*, 1893, p. 760; 1894, p. 179.

3. Tokumitsu, Y.: *Folia endocrin. Japon.*, *Tr. Jap. Path. Soc.* **24**: 444, 1934.

4. Gomez, D. M.: *Compt. rend. Soc. de biol.* **116**: 876, 1934; *Presse méd.* **42**: 1371 (Sept. 1) 1934; **43**: 219 (Feb. 9) 1935. Jablons.⁵

occurred in most of the experiments.²¹ The fact that in an occasional dog no reduction of blood pressure was observed was readily accounted for when the quantity of the active principle administered as determined by assays on rats was taken into account. It was found that from thirty to fifty times as much material had to be given to dogs in order to induce the same decline in blood pressure as occurred in rats. In the initial stages of our work it was difficult to produce sufficient of the extract to treat such a large animal as the dog, and it was often difficult to persuade the animal to ingest it. Vomiting occurred frequently after the administration of the preparation by stomach tube. In the dog as in the rat, toxic effects were frequently observed. These appeared to be of two types. In some animals no untoward effect appeared following a reduction of from 20 to 40 mm. in blood pressure. However, in other animals, and especially in those with marked hypertension of long duration, a drastic decline in blood pressure was accompanied by manifestations of uremia and even by death. In a third group of dogs, which were given relatively small amounts of the active principle as determined by assays on rats, untoward effects occurred without any decline in blood pressure. These effects, which were evidently due to the impurities in the extract, consisted in vomiting, weakness and usually diarrhea. More detailed discussion of the effects of these renal extracts in hypertensive animals have been published elsewhere.²²

The foregoing discussion concerning the effects of renal extracts on the blood pressure of hypertensive animals may be summarized by saying that it seems to be established beyond question that animals with experimental renal hypertension respond to such extracts with a decline in blood pressure. However, the question as to whether such a decline is in fact desirable or undesirable has not yet been clearly proved.

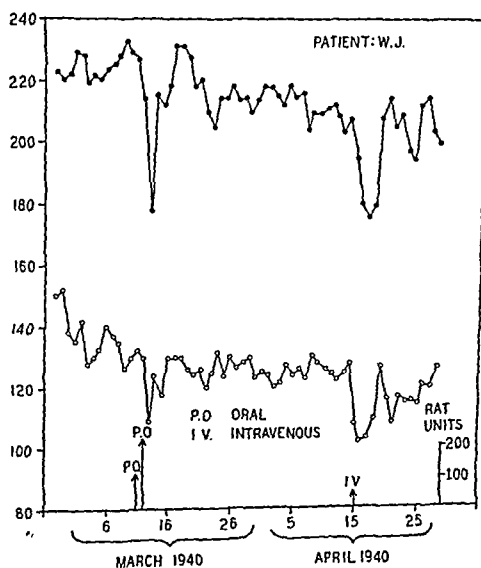


Chart 5.—Oral administration of renal extract was attended by a well marked decline in blood pressure, the effect being of short duration, lasting only for two or three days. On a later date a small dose of renal extract was administered intravenously and a decline of blood pressure of about 30 mm., lasting for about three days, occurred.

For this reason, attempts to treat human beings have naturally had to be carried out slowly and with the greatest caution.

OBSERVATIONS CONCERNING EFFECTS OF ADMINISTRATION OF RENAL ANTIPRESSOR SUBSTANCE TO PATIENTS WITH HYPERTENSION.

Thus far our observations on patients have been limited to subjects with advanced and severe hypertension. The first patients treated were given amounts of extract which we now know to have been far too

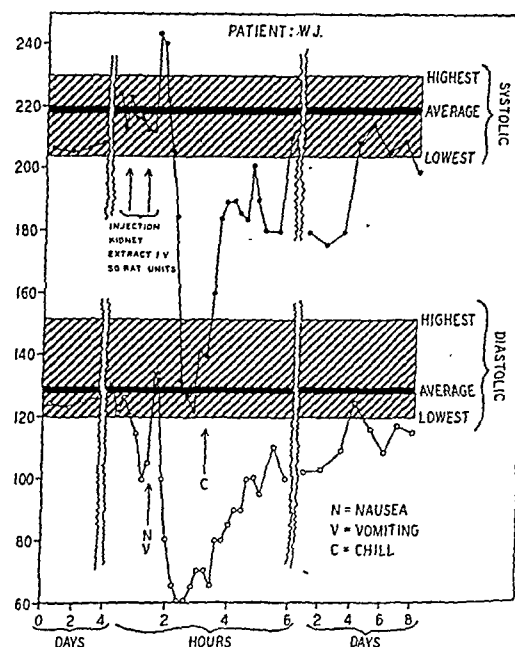


Chart 6.—This illustrates the immediate effects of the intravenous administration of renal extract. The marked decline in blood pressure which came on about two hours after the injection and was followed by a chill possibly represented a nonspecific protein reaction. The more lasting moderate decline was possibly due to the specific effect of the renal extract.

small to have any marked effect. We have treated only a few patients with an amount which would seem adequate, as judged by assays on rats, namely 150 or more oral units a day for a period of several days. The first patient to receive the extract orally in adequate amount was treated in November 1938. This man had malignant hypertension with beginning uremia. He had chronic prostatitis with urinary retention and was therefore catheterized throughout the course of treatment. Because he was desperately ill, the extract was begun on his third day in the hospital. The blood pressure was measured at intervals of every four hours, all of the measurements for a given day being averaged and recorded as one point in chart 3. After several days' treatment a marked decline in blood pressure occurred. About the same time definite clinical improvement with decline in the nonprotein nitrogen of the blood was observed. However, the latter effects may well have been due to the effects of catheterization. As soon as the blood pressure displayed a well marked decline, the treatment was stopped. The blood pressure remained at a relatively low level for several days and then rose to the preexisting value, the patient's symptoms becoming worse. Shortly afterward pneumonia developed and the patient died.

The second patient given adequate amounts of the extract was treated in April 1939. In this case the level of the blood pressure had been studied carefully for a period of several weeks in the hospital a number of months before. After an additional admission to the hospital and a week's control period the administration of the extract was begun with apparently gratifying results on the blood pressure and on the headaches.

21. Williams, J. R., Jr.; Grollman, Arthur, and Harrison, T. R.: *Am. J. Physiol.*, to be published.

22. Harrison, Grollman and Williams.¹⁸ Williams, Grollman and Harrison.²¹

After several weeks the blood pressure had gradually risen to the pretreatment level and the extract was again administered orally with an apparent decline in pressure (chart 4).

Results on another patient are illustrated in charts 5 and 6. This patient was given a total of about 200 rat units in forty-eight hours. The extracts then had to be discontinued because of diarrhea, which was accompanied by some nausea and vomiting. These symptoms were due we believe to impurities in the extract. This patient exhibited a well marked decline in blood pressure, which lasted, however, for only about twenty-four hours, the pressure then returning to the preexisting level. In order to determine whether the decline in blood pressure could be accounted for solely on the basis of the diarrhea, the patient was later given an amount of magnesium sulfate sufficient to produce a diarrhea approximately as severe as that which occurred during the administration of renal extract. No significant decline in blood pressure occurred. This patient was later given additional renal extract intravenously and a second decline in blood pressure occurred. The possibility that this may have been due to a nonspecific protein reaction has not been eliminated.

In one patient treated orally no decrease in blood pressure was observed even though the patient received what appeared to be adequate amounts of extract during a period of several days. The blood pressure curve of this patient is shown in chart 7.

Observations made during August 1939 on a fifth patient are illustrated in chart 8. This man had severe and advanced malignant hypertension. Prior to the administration of renal extract he was in a state of stupor, was disoriented and had severe headaches which had failed to respond to the usual methods of treatment. During the administration of the renal extract a slow decline in the blood pressure occurred, and this persisted for a number of days after the therapy was discontinued. Coincident with the decline in blood pressure there was marked improvement in the mental

decline which occurred during and immediately after the administration of renal extract. Results similar to those here reported have been obtained in several other patients. These will be reported in detail at a later date. Although all of the patients who have been cited were studied while in the

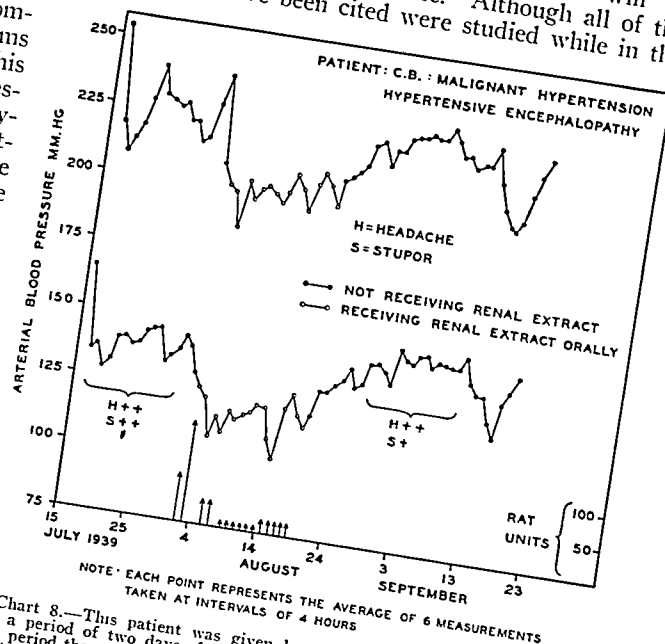


Chart 8.—This patient was given large doses of the extract by mouth for a period of two days, followed by small doses for ten days. During this period there was a moderate decline in blood pressure and well marked clinical improvement. After the extract had been discontinued the blood pressure rose slowly over a period of ten days to the previous level. At a later date he showed a spontaneous decline in blood pressure, which was less striking and of shorter duration than that which occurred while he was receiving the extract. Symptomatic improvement was marked in this man during the time the extract was being given.

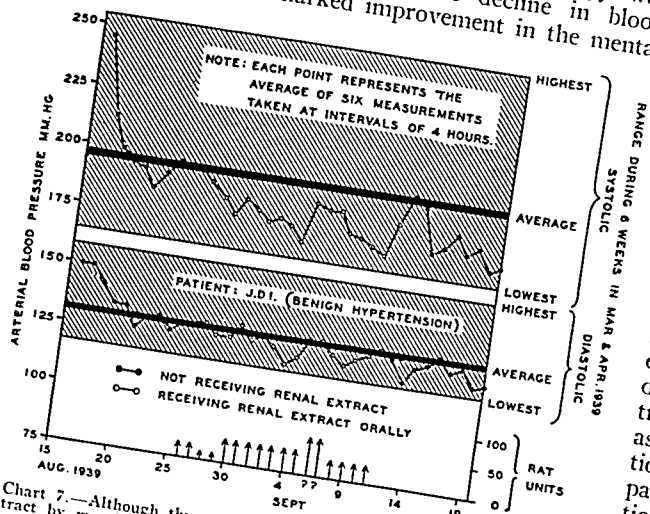


Chart 7.—Although this patient received moderate sized doses of renal extract by mouth over a period of two weeks, no significant decline in blood pressure occurred.

hospital and although with the exception of the first patient the blood pressure had been observed for a considerable time before the administration of renal extract, we prefer to draw no conclusions as regards the therapeutic effect in patients. The subjective improvement which seemed to occur might conceivably have been the effect of suggestion. Although the method of study makes it very unlikely that the declines in pressure could have been spontaneous, this possibility has not been entirely excluded. Extremely large amounts of kidney are required at the present time in order to produce a single human dose. Furthermore, there is at present no certain method of determining which patients have hypertension of renal origin, and it is only on such patients that the extract would be expected to be effective. Finally, since a marked decline in blood pressure occurring after the administration of the extract in animals has frequently been associated with severe untoward symptoms, great caution must necessarily be used in the treatment of patients until more is known of the nature of this reaction. Every effort is being made to overcome these difficulties as rapidly as possible. The fact that Page, Helmer, Kohlstaedt, Fouts, Kempf and Corcoran²³ have subsequently but independently obtained both in animals and in patients results comparable to those here recorded, which confirm our earlier reported work,²⁴

23. Page, Irvine; Helmer, O. M.; Kohlstaedt, K. G.; Fouts, P. J.; Kempf, G. F., and Corcoran, A. C.. Personal communication to the authors.
24. Our results demonstrating decline in blood pressure in hypertensive animals and patients following the administration of renal extract were reported before the American Society for Clinical Investigation, May 1, 1939; before the Cleveland Academy of Medicine, September 15; before the Johns Hopkins Medical Society, November 13; before the Washington Heart Association, November 15, and before the American Association for the Advancement of Science, December 29.

strengthens the probability that the declines in blood pressure exhibited by our patients have been due to the therapy rather than coincidental. However, until the difficulties mentioned can be overcome and until a much larger series of patients can be studied, we prefer to regard the studies on patients as inconclusive and as still in the experimental stage.

The chemical nature of the active principle of our extract is still uncertain. Under proper conditions of temperature, salt concentration and pH the active principle is soluble in 40 per cent acetone and can be precipitated by the addition of further acetone in sufficient quantity. It can also be precipitated by the use of ammonium sulfate or by saturation with sodium chloride. Details concerning the method of preparation of the crude extract have been published elsewhere.²⁵

animals. So far as we know, no other substance has been described which has the properties of long duration of action, effectiveness by mouth and lack of reduction of blood pressure in normal animals as compared to marked reduction of blood pressure in animals with renal hypertension. As far as we can judge from the available data, the extracts derived by other investigators from tissues other than kidney display few properties in common with our preparation. More comprehensive investigations concerning the chemical and biologic properties of the active substance are in progress and will be reported on at a later date.

SUMMARY

1. Recent experimental studies indicate clearly that a rational and logical basis exists for the possible therapeutic value of renal extract in hypertension of renal origin.

Comparison of Some Properties of the Renal Antipressor Substance with Those of Certain Depressor Substances

Substance	Source	Hypotensive Effect on Experimental Animals				Oral Effectiveness Demonstrated	Precipitation by Ammonium Sulfate	Dialyzability	Comment
		Normal Animals		Hypertensive Animals					
		Decline	Duration	Decline	Duration				
Histamine.....	Nearly all tissues	+	Seconds or minutes	+	Seconds or minutes	0	0	+	No depressor effect in etherized rabbits
Acetylcholine.....	Many tissues	+	Seconds or minutes	+	Seconds or minutes	0	0	+	Depressor effect abolished by atropine
Adenosine (and related compounds)	Muscle, blood (all tissues)	+	Seconds or minutes	+	Seconds or minutes	0	0	+	Causes heart block in guinea pigs
Urohypotensin (Abelous and Bardier)	Urine	+	Minutes	?	?	0	+	0	Constriction of pupil of rabbit's eyes (?)
Kallikrein (padutin) (Frey and Kraut)	Urine, pancreas	+	Seconds	?	?	0	+	0	Inactivated by blood
Depressan (detonin) (Wollheim and Lange)	Urine, posterior lobe of hypophysis	+	Minutes or hours	?	?	0	+	0	Absent from urine in essential hypertension; present in renal hypertension and in normal subjects
McDonald's depressor substance	Liver	+	Minutes or hours	?	?	0	?	?	Precipitated by phosphotungstic acid
Lange's depressor substance..	Intestine, mesentery, nearly all tissues	+	Seconds or minutes	?	?	0	+	+	A guanidine derivative?
Depressor substance of Major and Weber	Brain	+	Minutes	?	?	0	?	?	Not precipitated by silver or by phosphotungstic acid
Substance of Euler and Gadum	Intestine, brain	+	Seconds	?	?	0	0	+	Contraction of rabbit's intestine
Gomez's depressor substance	Renal cortex	?	?	?	?	0	?	?	Chemical properties and animal experiments not reported
Tubulin (Jablons).....	Kidney	?	?	?	?	0	?	?	Animal experiments not reported
Renal antipressor substance *	Kidney	0	0	+	Days	+	+	0	Precipitated by picric acid

* Pharmacologic properties as given refer to effects obtained by oral administration.

RELATION OF RENAL ANTIPRESSOR SUBSTANCE
TO OTHER PREVIOUSLY DESCRIBED TISSUE
EXTRACTIVES

The renal antipressor substance described in this paper differs in many respects from the depressor preparations reported by others. The table presents a summary of certain simple chemical and pharmacologic properties of the extract as compared with certain non-specific depressor substances of known chemical composition and as compared with extracts described by previous investigators. The chemical properties and the type of action are entirely different from those of histamine, choline and the adenosine group of compounds. There likewise appear to be distinct differences from the products obtained by others from kidney, and although our extract has certain properties resembling those of urohypotensin and depressan it differs from these in that oral doses which cause marked decline in the blood pressure of animals with renal hypertension have little or no effect on the blood pressure of normal

2. Extracts of the kidney have been prepared which, when administered orally to normal animals, do not produce a decline in blood pressure but have the property of partially inhibiting the pressor effect of subsequently injected renin.

3. When extracts containing the renal antipressor substance in sufficient amount are administered, either parenterally or orally, to animals with experimental renal hypertension, a well marked and prolonged decline in the blood pressure occurs.

4. A small number of patients have been treated by means of the oral or parenteral administration of the renal antipressor substance. In most of the subjects a decline in the blood pressure has occurred. However, for reasons which have been mentioned we prefer not to draw any conclusions at the present time from these observations.

5. The available evidence indicates that the renal antipressor substance has certain unique properties which differentiate it from various depressor tissue extractives described by previous investigators.

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ABSTRACT OF DISCUSSION

DR. MURRAY STEELE, New York: Dr. Harrison has been largely instrumental in bringing before us in this country the work of Tigerstedt and Bergman, which was confirmed and extended by Bigel and Strauss and by Hessel and Hartwich. Shortly after he had become interested in the pressor substances, observations of the behavior of reactions of animals led him to the deduction that there was an antipressor substance also in the renal tissue. From this point on he was fortunate in being associated with Dr. Grollman, and they have this morning presented the results of that work. I should like to point out a phenomenon which is of extraordinary interest in the development of these researches. When interest in a subject is great, many laboratories soon become involved. Since we can in these days disseminate news more rapidly by publication and at meetings, the frequency of simultaneous work and simultaneous discoveries increases and I think this work is an example of that fact. By entirely different reasoning, in two separate laboratories, the same conclusion has been reached at almost the same time. Dr. Harrison, from intimate knowledge of the behavior of animals injected with renin and from the knowledge that removal of the kidneys will increase the rise in pressure obtained with renin, deduced that there was an antipressor substance in the kidney. Dr. Page, in his laboratory, from more purely chemical reasoning, from the fact that in a perfused animal something in the blood was used up which was not the renin activator, yet which prevented the action of the renin-renin activator system, came to the conclusion that a renal antipressor substance developed. Dr. Harrison has emphasized the fact that this depressor substance is costly, very difficult to obtain at the moment, and that it is not yet clear what the clinical uses are or will be. What is clear is that a most extraordinary tool for the further study of the mechanism of the development of renal humoral hypertension has been found.

DR. M. C. WINTERNITZ, New Haven, Conn.: The procedures that have been utilized are valuable in association with humoral pressor effects elicited through the kidney. As a pathologist, my interest lies in structural variants of disease and not in physiologic or chemical detail. During the past year these approaches have been found indispensable. The authors have said everything I might have contributed in discussion and they have been conservative. They have raised the question whether it is desirable to lower blood pressure in renal hypertension. Now that we know hyperpyrexia is of therapeutic value in some diseases and no longer always want to reduce fever, perhaps a similar point of view may be desirable for hypertension. "Renin" is a crude product; its fractions have not been isolated and consequently their chemical and physiologic properties are not known. The ammonium sulfate preparation which the authors mentioned contains pressor and depressor substances as well as agents that necrotize muscle, including heart muscle and the smooth muscle of arteries, veins and other hollow muscular viscera, also diaphragmatic muscle but not skeletal muscle. It probably contains still other factors that result in hemorrhages. The fate of individual substances of such a group when given by mouth is in itself a problem. A similar preparation injected intravenously into dogs with or without kidneys results in vascular lesions of the type that characterize malignant nephrosclerosis. Renin D, I think our chairman has prepared. It has been purified by Dr. Swingle, and my associate Dr. Mylon has carried the separation further. Renin D contains three ferments for which it has been tested and perhaps many more. The three are a tryptic, a peptic and a catalytic type. It also has a high protein content and its nonprotein nitrogen will increase rapidly at body temperature. The enzyme activity and almost all if not all of the protein of renin D are removable. At this stage, when the nitrogen is reduced to 1 microgram for every kilogram of the dog's weight, intravenous injection results in a typical renin elevation of the blood pressure of from 50 to 75 mm. of mercury. Even this product can be shown to be impure by bio-assay. Obviously intravenous use of renin is fraught with danger. Experimentally it has great value for the production of malignant nephrosclerosis with lesions in many important viscera including the myocardium, brain, kidneys and blood vessels. There is no doubt great dif-

ference between its administration by mouth and intravenously. Nothing that I have said, therefore, could apply to its use by the first method.

DR. EDGAR ALLEN, Rochester, Minn.: The work which Dr. Harrison and his associates and others are doing is of great interest to those who practice clinical medicine. Many patients with so-called essential hypertension or hypertension of other origins are seen and physicians are desperate for some remedy to take care of these patients. In present day American life essential hypertension seems to be the most serious disease, accounting for at least twice as many deaths as cancer. It would not be fair to leave this discussion on the note that it is not desirable to lower blood pressure in essential hypertension. I am sure that what Dr. Harrison meant to discuss and what Dr. Winternitz wished to emphasize was that it may not be desirable to reduce blood pressure by means of the extract which Dr. Harrison has discussed. However, it is highly desirable to lower the blood pressure of patients with essential hypertension, and when this is accomplished all the serious effects of hypertension disappear. The work which began with Dr. Goldblatt and has been carried on by Dr. Harrison and his associates and others has been of great interest to experimental medicine. It does not detract from this work to say that with minor exceptions it has not been of any help to clinicians who take care of patients with essential hypertension. The single exception to date is that occasionally one sees a patient with hypertension which is indistinguishable from the so-called essential hypertension in man, which is renal in origin and which has been cured by the removal of a diseased kidney. There are in the literature at least 100 remedies for essential hypertension, and the conservative way in which Dr. Harrison has approached this problem precludes the possibility that there would be unjust claims by him or his associates. However, if the usual program follows, there will be unjustified claims by others. The implication has been that, since this extract reduces the blood pressure of animals with experimental hypertension and does not reduce the blood pressure of animals with normal blood pressure, it has a specific effect on the genesis of hypertension induced experimentally. However, it is easy to reduce the blood pressure of many patients with essential hypertension and quite difficult to reduce the blood pressure of patients with normal pressure. Sleep may reduce the blood pressure of a patient with hypertension from, say, 240 systolic to 160 systolic, or 140 systolic, but sleep will not reduce the blood pressure of a patient with normal blood pressure more than 10 or 15 mm. of mercury. It would not be fair to conclude from this observation that the reason the patient with essential hypertension has elevated blood pressure is that he has not had sleep. It is true only that it is easier to reduce the blood pressure when it is elevated than when it is normal.

DR. FREDERICK M. ALLEN, New York: The problem of renal-vascular disease is so complex that a coordinated approach is apt to be most productive, as I believe was illustrated by our investigation which began in Morristown in 1920, following the same lines as had previously been pursued in diabetes. For historical interest, and in behalf of about a dozen former co-workers, I wish to mention the following published results: 1. Extensive studies with partial nephrectomy furnished the first demonstration that the principal phenomena of nephritis are explainable by simple quantitative reduction of functioning renal tissue. 2. Explantation of the kidneys was devised for various investigative purposes, which could only partly be carried out. 3. With the aid of a new auscultatory device for routine pressure readings in dogs, the first discovery of experimental chronic hypertension was made by clamping the kidney blood vessels, a method which not only holds priority but which also can be shown to be still the best hypertensive method for some purposes. 4. Therapeutically, rigid exclusion of salt from the diet was proposed. Here disputes can confidently be left to ultimate decision on one single unavoidable issue, namely accuracy of clinical observation. 5. No study was made of Tigerstedt's hypertensive substance renin, but an attempt in the direction of organotherapy yielded the first discovery of an acid-alcohol extract of fresh kidneys which was able to reduce blood pressure. In view of the recent activities along all five of these lines, it is worth noticing that all these developments would have been equally possible fifteen years ago. The delay has been

due solely to the power of a monopolistic autocracy not only in controlling but in suppressing research. There were also other fundamental lines of investigation, besides the five mentioned, which were not published and have not been discovered elsewhere; and no lack of effort on my part has been responsible for stopping both this and my diabetic work. The kidney extract research would have been lost altogether if it had not been continued by Dr. Jablons. He seems to have a priority of several years in some methods of purifying the extract and in studies of sodium and potassium, which may explain some of the variable or fatal results described by others. I have not been able to keep in touch with details of the recent developments in this field, which are both brilliant and confusing. Dr. Harrison and his collaborators are to be congratulated on their reported success with oral administration, and the papers by other authors have combined to make this one of the subjects of leading interest in this convention. Nevertheless, I revert to my original statement concerning the complex renal-vascular problem. Kidney extract does not furnish the entire solution of this problem. However great its theoretical or practical importance may prove to be, I think most investigators will join in warning practitioners that no spectacular remedy like insulin is at hand. We may be on the way, but we have not yet reached any certainty regarding either the cause or the cure of essential hypertension.

DR. BENJAMIN JABLONS, New York: Dr. Harrison's report is heartening to those of us who have been active in this field for some time. I have been working with kidney extracts for nine years. During that time two outstanding facts have become apparent, and the work of Dr. Harrison, Dr. Page and others confirms them. The first is that the hypotensive extract is not easily obtained. While a laboratory extract will give very startling results used on patients or in experimentally induced hypertensive animals, the same material produced on a large scale in a pharmaceutical plant will often not give the same results. The second is that suitable cases must be selected. In analyzing failures I have found that it was important to make certain that the individual for whom this extract is to be used does not have irreversible changes in the arterioles. Recently I have tested a number of these cases for the presence of peripheral vasospasm and have found it in a considerable number of cases of essential hypertension. If kidney extract produces peripheral vasodilatation, one is encouraged to proceed with its use and can expect satisfactory results. Another reason which I believe contributed to failure in some instances was the presence of protein in the extract. For eight years I have been working with a protein-free extract. With this protein-free, aqueous acid-alcohol extract I have obtained some very startling results. I have also had a number of failures. We are indebted to Dr. Harrison and his co-workers for emphasizing the oral use of extract. A few years ago I used it orally without results. Encouraged by his published results, I have again used our extract orally in seven cases. Four responded, two failed, and in one case the condition was definitely aggravated. Our extract is not toxic to animals in doses below 6 per cent of body weight. It is prepared by a method presented before the New York State Medical Society in May 1937 and published in the Jan. 1, 1938, issue of the *New York State Journal of Medicine*. One case of malignant hypertension has been under treatment since May 1933, and many others of shorter duration have shown no toxic effects. By watching the blood electrolyte concentration and chloride excretion in the urine, one can determine indications and contraindications for extract administration. The summarized results will be published shortly.

DR. T. R. HARRISON, Nashville Tenn.: I agree with Dr. Winternitz that an ammonium sulfate precipitate has in it many things, and it is because of this fact that we have mainly employed oral administration even though larger amounts are needed. We are hoping that the time will soon come when we may be able to purify the material better and shift over to parenteral therapy. As to whether it is desirable to lower the blood pressure, I think it is but am not certain. The question is, Is it desirable to lower it to normal, assuming one could? That I don't know, and certainly some of our animals have died when the pressure has been lowered to normal. We aren't certain that the lowering of blood pressure has been the cause of death. It may have been due to some impurities in the

extract. But until we get over that hurdle we have to be extremely cautious. About the specificity, our own evidence suggests that the material is specific for kidney but more studies are necessary before we can be certain. The difficult question as to whether essential hypertension is renal I am going to dodge by saying that in my own opinion, which is subject to revision at any moment, some instances are and some are not. I should like to point out to Dr. Jablons that there have been no deaths of patients in Nashville, and Dr. Page tells me none in Indianapolis. Because of the deaths of animals one has been cautious about administering this to human beings. I think that if some of the previous workers had studied hypertensive animals before they studied hypertensive patients their problems might have progressed more rapidly. This isn't confirmation of Dr. Jablons' work. Dr. Jablons reported that with a fraction obtained by extraction of kidney in about 95 per cent acid alcohol he could obtain an active blood pressure lowering substance. One of the methods we frequently use to make our material is to collect it in 95 per cent acid alcohol, but we throw away the material that is soluble in 95 per cent acid alcohol, which is what Dr. Jablons uses; and the material that is insoluble, which Dr. Jablons discards, gives us the typical results, so that it is quite clear that Dr. Jablons is dealing with one kidney extract and we are dealing with another, and that they are not the same thing. Which is the better kidney extract, time will have to tell.

OSTEOMYELITIS OF THE SKULL FOLLOWING FRONTAL SINUSITIS

A. S. MACMILLAN, M.D.

BOSTON

Before considering osteomyelitis as a complication of frontal sinusitis it might be well for me to review briefly the roentgenologic aspects of the acute and chronic infections in this area which have traveled up the frontonasal duct.

Before one can arrive at an intelligent interpretation of the density of a sinus as seen in the postero-anterior view, one must examine the lateral view for the depth of the sinus and for the thickness of the anterior and posterior walls and note any irregularities in both depth and thickness. One must then note the character of the bones of the skull—the relative thickness of the cortex to that of the medulla. Then, and only then, can the density one expects to find in the frontal view be evaluated.

The minimum number of views that should be taken are four, namely a lateral, a postero-anterior, a Waters position in the prone and a fluid level position.

When the nasofrontal duct becomes completely or partially blocked, the membrane thickened and its secretion retained within the sinus, it is always surprising how little increase there is in density over the normal. Often the difference in density between the two frontal sinuses is so slight, even when they are completely filled, that other means of diagnosis must be looked for. In this connection it must be remembered that normally there may be an opening in the bony septum between the two frontals, and when this occurs the membrane of the normal sinus becomes thickened and pushed away from the interfrontal septum.

It is a well established fact that acute inflammation of the mucous membrane causes decalcification of the underlying bone. This is as true in acute frontal sinusitis as it is in mastoiditis. One change I look for in mastoiditis is decalcification of the mastoid cell

Read before the joint meeting of the Section on Laryngology, Otology and Rhinology and the Section on Radiology at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

partitions. I expect this to occur in from seven to ten days after onset of infection of the mucous membrane. In frontal sinusitis one must watch for this decalcification. Loss of the entire outline of the sinus due to this loss of the inner cortical lining is to be



Fig. 1.—A white youth aged 16 had a history of sinusitis with swelling about the left eye three weeks before admission. This subsided. Two days before admission swelling of the left eyelids recurred and there was swelling about 2 cm. in diameter in the midline above the frontal sinus. A roentgenogram revealed an area of osteomyelitis at this point. Removal of a wide area of bone including the necrotic area resulted in recovery without complications.

expected, but localized loss of the outline is an entirely different matter.

In subacute and chronic sinusitis, lasting a matter of weeks, there is an increase in density of the anterior and posterior walls and the surrounding bone, nature's walling off process. This eventually results in sclerosis so consistently seen in these chronic infections. At



Fig. 2.—A white girl aged 16 years had a history of infection of the upper respiratory tract and frontal headache fifteen days before admission. Four days later she had swelling and edema of the forehead—development of an orbital abscess—which was drained with complete subsidence of all symptoms. Nine days later severe frontal headache, nausea and vomiting occurred. Examination revealed evidence of a brain abscess of the left frontal lobe. This was drained. The sinuses at this time were perfectly clear. One month later, with no intervening symptoms, edema and tenderness developed over the left eye. X-ray examination disclosed osteomyelitis of the front wall of the frontal sinus extending out into the frontal bone; radical removal of the bone was done and recovery was uneventful.

times it is difficult to make out fluid levels through this sclerosis, again showing how small a part the density of the contents of the sinus has to do with the total density.

The progress of infection of an acute frontal sinus, which must be watched for, is the change in density, loss of its outline and the reaction in the surrounding bone. In a case of severe acute infection in which frontal headache is accompanied by swelling and edema of the tissues over the outline of the sinus, but sharply limited to the area of the infected sinus, a constant watch should be maintained for minute perforations of the anterior wall. These perforations are caused by the enlargement of the thrombosed small penetrating vessels coming through the bone from the infected mucous membrane. These minute perforations can be detected in the anterior views and are one of the early x-ray signs of bone infection. Localized loss of the outline due to actual necrosis of the wall at one point is an important accompanying finding. A tangential view of the frontal wall in question may show localized necrosis. Infection must be present at least a week before these signs become evident.

Involvement of the posterior wall of the frontal sinus may be determined by noting the change in the



Fig. 3.—A white man aged 25 had left pansinusitis with an orbital abscess. An external frontal operation (Lynch) was done; ten days later there were signs of an intracranial pathologic condition. He was referred to the Massachusetts Eye and Ear Infirmary. Examination revealed osteomyelitis extending by thrombophlebitis from the outer border of the left frontal sinus. At operation a large extradural abscess was found. Recovery resulted.

pattern of the composite picture of the anterior and posterior walls, as seen in another view. If the infection remained in the mucous membrane, or even in the bone, conditions would not be so serious.

The thrombosed vessels of the mucous membrane which carry infection into the bone are continuous with those entering the dura and brain, and blood sinuses, and may produce infection in these areas. These serious complications may occur simultaneously with the bone infection so that an apparently solid posterior wall of an infected frontal sinus may be covering an extradural or brain abscess.

The frontal bone is rich in diploetic veins. Two fairly constant plexuses occur at the outer angles in the region of the frontal bossae. Others may be seen to course through the walls of the frontal bone and enter blood lakes or parasinoidal sinuses, which in turn empty into the longitudinal sinus. For the many veins large enough to be seen on the x-ray films there are

also many microscopic ones that are as important in the process of dissemination of the infection. These blood vessels and sinuses should be watched for either any change in their outline or any loss of density in the surrounding bone. This involvement in the diploe is



Fig. 4.—A Negro aged 19 years had left frontal sinusitis with extension of infection into the left frontal bone; operation consisted of removal of the infected bone and some normal bone, working from the infected area outward. This conservative operation was followed by further extension and the development of a brain abscess from which the patient died. Osteomyelitis of the skull cannot be dealt with in a conservative manner.

very rapid, and change can be detected from day to day on the x-ray film.

My experience with the x-ray appearances in infection of the frontal bone, secondary to frontal sinusitis, extends over a period of twenty years, during which time I have seen a marked change in treatment of osteomyelitis. In the eighty-six cases which I have seen at the Massachusetts Eye and Ear Infirmary, the infection was limited to the front or posterior wall of the sinus. The mortality in the group was 14 per cent, deaths being due to epidural abscess, subdural abscess, brain abscess or meningitis. Thirty-six patients developed osteomyelitis extending beyond the limits of the frontal sinus into the frontal bone (figs. 1, 2 and 3).



Fig. 5.—Reproduction of a roentgenogram of a removed fragment of frontal bone measuring 10 by 5 cm., showing in the lower part the outline of the frontal sinuses and above the osteomyelitis breaking out along the thrombosed diploetic veins. Microscopic examination of the decalcified bone showed marked involvement in the areas that appeared normal by x-ray examination.

the surgeon usually waited for x-ray signs of osteomyelitis. When the diagnosis was made by the roentgenologist, the necrotic bone and some of the normal bone were removed. It was not fully realized that the bone

would be infected for from $1\frac{3}{4}$ to 2 inches beyond the necrotic area discernible on the x-ray film. If the surgeon wished to be conservative he waited, hoping that the lesion would localize and that sequestrums would form which he could remove. The tragedy of this method was that in every case in which sequestration was awaited a fatal complication arose.

During the time when the delayed or incomplete type of operation was in use frequent x-ray examinations were made to see whether any further involvement was taking place. The mortality rate with this type of puttering surgery was high, 58 per cent (fig. 4).

In the last seventeen cases a large part of the frontal bone was removed in one operation, including the infected area, and out into healthy bone for upward of 2 inches, thus eliminating osteomyelitis, the cause of the complications (figs. 5 and 6).

In the fulminating cases operation was done before any indication of involvement could be seen by x-ray examinations for the diagnosis depended entirely on the one all important sign of pitting edema. Microscopically the removed bone has always been found to



Fig. 6.—Appearance eighteen months after radical removal of part of the frontal bone for extensive osteomyelitis. This also shows the first bone graft put in by the plastic surgeon to cover the defect.

be thrombosed with infected veins; in a number of these cases x-ray examination of the specimen showed nothing to suggest the diagnosis. This form of treatment has reduced the mortality to 25 per cent, and if the two cases in which operation was done in the presence of an overwhelming fulminating meningitis are eliminated from this count, the mortality would be down to 12.5 per cent. The meningitis in these cases arose from an infection of the upper respiratory tract of from four to five days' duration. There was pus in the frontal sinus and pus oozing from the cut surface of the bone even at the hair line. In such cases the operation could be regarded only as a gesture.

CONCLUSION

1. Osteomyelitis of the skull, because of its complications, is a most serious disease.
2. The x-ray evidence of this disease should not be waited for in the presence of clinical evidence.
3. Pitting edema to the hair line is a positive sign of infected bone.
4. Puttering surgery invites disaster.

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OSTEOMYELITIS OF THE FRONTAL BONE

AS A COMPLICATION OF FRONTAL SINUSITIS

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Osteomyelitis of the frontal bone is one of the most dreaded of surgical diseases and one of the most fatal. In some parts of the country osteomyelitis of the frontal bone as a complication of infection of the frontal sinus is a rare disease. In my locality the fulminating type, and most of our cases fall into this class, is fairly common. Osteomyelitis of the long bones of the leg occurs over wider areas. When a disease is deadly, when patients suffering from it may come first to the general practitioner, the surgeon or the specialist and when recent work has been done on the disease the results of which are not yet in the textbooks, I feel that it becomes a subject of general interest. At least this is my hope. Also this is my alibi for presenting the subject today.

During the past seven years I have begun to approach these cases with more confidence. This is due to what I have learned by the systematic microscopic examination of specimens of osteomyelitic bone removed at operation during this period and by routine interval roentgenograms before and after operation. This continued study has made the source of the infection, its manner of spread and the speed of the spread clearer. This knowledge has led to the adoption by us in the fulminating type of a radical early operation which meets the disease head on instead of by the customary prolonged and generally unsuccessful pursuit from the rear. The infection in these cases does not wait while the surgeon watches and waits. It must be dealt with by an early "blitzkrieg."

So much by way of introduction. In former papers I have dealt with the subject of osteomyelitis of the frontal bone somewhat exhaustively. The space allotted for this paper permits only a condensed review.

THE ORGANISM

The organism in osteomyelitis of the frontal bone generally is *Staphylococcus albus* or *aureus*, and occasionally the streptococcus.

THE TYPES OF OSTEOMYELITIS

The disease occurs as two types—the fulminating, rapidly spreading form of which swimming is a frequent cause, and the less virulent localizing form which tends to burn itself out and form sequestrums. If the patient is septic, with pitting edema of the skin of the forehead half way to the hair line or at the hair line as often happens, I consider this as the fulminating type. Not having second sight, I cannot pick the case in which it is safe to operate conservatively and do what might be called a minor operation and hope for sequestration. I am not slipping into the grand manner when I say that on the time and the type of operation which the surgeon elects hangs the life of the patient.

THE DIPLOETIC VEINS

The diploetic veins of the skull are numerous and connect superficially with the veins of the scalp and have deep connections with all the blood sinuses of

the skull. The diploetic veins of the frontal bone are a continuation of the veins of the mucous membrane of the frontal sinus. Relatively they are very large and are absent from the frontal bone in only 3 per cent of the cases. The infection in the frontal sinus produces thrombophlebitis of the veins of the mucous membrane and of the diploetic veins of the frontal bone. The infection spreads to the bone marrow in which the veins are located. The branches of the diploetic veins run outward to the periosteum of the frontal bone and inward to the dura. The dura seems to attract the infection more strongly than the periosteum.

As everything in osteomyelitis of the frontal bone complicating frontal sinusitis harks back to infection of the mucous membrane of the frontal sinus and its walls, I shall have to bore the reader with the changes which infection causes in these structures. In no other part of the body do the pathologic changes caused by infection determine so definitely the course of the infection, its manner of spread and, most important of all, the type of surgery to be employed if it is to be successful and the time when this surgery is indicated.

THE BONE MARROW

There are two kinds of bone marrow—the yellow or fat marrow and the red or blood forming marrow.

Yellow marrow looks like a collection of fat cells. Between the fat cells there are narrow stellate spaces which are potential blood lakes. The cells lining the stellate spaces are capable of great activity in the production of fibrous tissue.

The red bone marrow, instead of having the empty look of the fat marrow, is crowded with every type of blood cell and every ancestor, immediate and remote, of the various types of blood cells. It is a bewildering maze not as yet fully deciphered. It still offers a fertile field for dispute among the experts. The diploetic veins run in both fat and red marrow.

THE CHANGES PRODUCED IN BONE MARROW BY INFECTION

The changes which infection produces in bone marrow occur in a definite order. The veins in the fat marrow enlarge greatly and often break, causing hemorrhage in the marrow space. Very early, so early that it almost seems to occur at the same time, the veins enlarge and a protective fibrosis begins in both the yellow and the red marrow. If the infection wins out over the protective fibrosis, patches of bone die and form sequestrums. In the neighborhood of a sequestrum the osteoblasts work hard to form new bone. As an added means of protection in nature's fight to conquer the infection, a layer of new bone made up of very fine trabeculae is often laid down over the dura. This, however, is so often found to be infected that it seems to be more of a carrier of infection than a barrier to its spread.

The only thing in this picture that is not familiar is the early protective fibrosis which forms in the marrow cells. On seeing it, one feels that nature is doing its best for the patient from the very beginning.

SIGNS AND SYMPTOMS

As osteomyelitis of the frontal bone is in most cases a complication of acute infection of the frontal sinus, there are classic signs and symptoms which go with this condition. Pitting edema of the skin of the forehead (Pott's puffy tumor) is the first sign of involvement of the frontal bone. Microscopic examinations of bone

specimens have shown that the limit of the edema is a practical guide, and the only guide in fact, to the limit of infection in the bone marrow. In fulminating cases the edema quickly extends to the hair line. The patient's temperature rises according to the amount of toxins absorbed from the infected veins and marrow spaces. X-ray examination shows a cloudy frontal sinus and gives the number and position of the diploetic veins. As it takes from seven to ten days for bone necrosis to occur, the x-ray film is not positive for osteomyelitis until this time has elapsed.

When the edema is localized and does not extend, as happens in the rare case in which trauma is the cause of the osteomyelitis, the infection of the bone marrow may also be localized.

The microscopic examination of osteomyelitic bone specimens has given another practical point, namely around an area of necrosis the infection extends radially for from $1\frac{1}{2}$ to 2 inches. The applied value of this finding is evident.

COMPLICATIONS

Few surgical infections have more possible and immediate complications. Unlike osteomyelitis of the long bones, which is often tempestuous enough, osteomyelitis of the frontal bone has the dura and the brain as neighbors. This means that extradural and subdural abscess, meningitis and brain abscess are common complications and are always in the offing. In osteomyelitis of the tibia the infection runs along under the periosteum as it does in infection of the frontal bone and the marrow also is infected, but the tibia has not the bad acting neighbors which the frontal bone has. The old saying about a lighted match near a powder keg aptly applies to osteomyelitis of the frontal bone, only there are two powder kegs to blow up instead of one.

SURGICAL TREATMENT

When edema of the skin of the forehead extends to the hair line, as it quickly does in fulminating cases, I believe that the surgical treatment of choice is the removal of practically the whole of the frontal bone. I should do this even if the edema extended only half way to the hair line. Laterally removal of the bone should extend to the external angular process of the frontal bone on both sides. It is neater craftsmanship to remove the bone in one piece.

THE CUTANEOUS INCISION

The median T incision gives the best exposure and the best drainage. The stem of the T should begin at the hair line.

The arms of the T should be made at the upper limits of the eyebrows, not through them. A split eyebrow comes together poorly when the operation for the correction of the operative deformity is done. The area of bone to be removed is marked out with the electric burr and the burr holes are connected by means of the Gigli saw or rongeur. Usually the bone dissects easily from the superior longitudinal sinus. The greater part of both the front and the posterior wall of both frontal sinuses is removed in order to let the sinus obliterate. This I believe is the surest way to obliterate the frontal sinus, even in nonosteomyelitic cases.

The triangular skin flaps are sutured to the scalp and the wound is left wide open. The dura is protected with paraffin gauze. For most operators fancy and fashion have determined the solutions used on the dressings if anything other than salt solution is employed.

One by one bactericidal vaccines have appeared and have been used with much trumpeting, only to disappear from the literature in a short time.

I hold that it should be routine practice to open both frontal sinuses and remove the anterior and posterior walls of each. Both sinuses are usually infected or well on their way to infection. In order for one to be sure of what is going on both sinuses have to be opened. The x-ray film is an unreliable guide on this point.

When the bone to be removed has been marked out with the burr, it is not uncommon for the patient's condition to become poor. The operation is thereupon stopped and the patient given a transfusion on the table, to be repeated if necessary when he reaches his bed. This means that donors should have been selected to be available at once.

THE TIME OF CLOSURE OF THE OPERATIVE WOUND

From my experience I feel that three months is as early as closure should be attempted. Secondary operations in a number of cases have been necessary when a shorter period was tried. During the waiting period for the performance of the plastic repair the edges of the bone defect are watched by x-ray examination for recurrence of the osteomyelitis. This waiting period is hard for the patient because the preliminary deformity is often marked.

In one of the early cases in which closure was done at six weeks the patient had jacksonian convulsions at irregular intervals for a few months. I am wondering whether, had closure been delayed, the fibrous tissue which replaces granulation as the end result of the healing process would not have been more evenly distributed and not given the localized pressure which caused the convulsions.

THE REPAIR OF THE OPERATIVE DEFORMITY

The operation for osteomyelitis of the frontal bone is easy. The hard thing about it is to make up one's mind when to operate and what type of operation to use. The plastic repair, on the contrary, is the hardest of the surgical procedures called for in dealing with this condition. The repair of the deformity is not a job for the beginner in plastic surgery. Fortunately my associates and I have Dr. Kazanjian, who is anything but a beginner. The first step in the repair is to free the cutaneous flaps and the periosteum and bring the edges of the periosteum together as close as possible and then approximate the cutaneous edges neatly. After a wait of from twelve to eighteen months for bone regeneration in the operative defect, the deformity is corrected by the insertion of a bone implant or implants, as the case may require. At first these were taken from the crest of the tibia; now Dr. Kazanjian takes the implant from the crest of the ilium, because this has the right curve. A large piece is used to make the lower part of the reconstructed brow. Above this a smaller piece is placed. If this does not prove to give sufficient correction, at a later period cartilage or fat is used to supplement the bone. After this series of steps the deformity is corrected fully 90 per cent. The net result of all these operative measures in 80 per cent of the cases is a live patient and a moderate and bearable deformity.

At this point I wish to remind the ophthalmologists that osteomyelitis of the frontal bone has been known to follow orbital abscess. In a few cases the pus in the orbit is not really an orbital abscess but comes from the frontal sinus by means of a break in the floor of

this sinus. In most cases of true orbital abscess the infection originates in the ethmoidal labyrinth and should be dealt with by an external operation on the labyrinth. What might be called the Italian method of treatment, universally practiced up to a few years ago, consisted in repeated stabbing of the orbit above and below the globe of the eye, often boxing the compass a number of times. The usual result was that recovery took from six weeks to six months. At times, however, osteomyelitis of the frontal bone resulted. I know of a recent case of orbital abscess treated in this inadequate fashion which ended up with osteomyelitis of the frontal sinus, then of the frontal bone. This was followed by brain abscess and death. I am confident that the examination of the old hospital records of any eye clinic would uncover a number of such cases.

REPAIR OF THE BONE DEFECT

In our cases nature's repair of the operative defect has been good only in young patients; in adults it has been very slow. Dr. Kazanjian suspects that we have maltreated the periosteum in the first stage of the operation. We were then thinking more of circumventing the infection than of the operative deformity. Now that we are surer of what to expect from operation in these desperate cases, he feels that more care should be given to preserving the periosteum at the first operation and in freeing it and bringing it together in the plastic operation.

Sprinkling bone dust on the dura is an old procedure. It was used successfully during the World War. Skillern uses it in connection with primary closure of the operative wound.

COMMENT

There are several unsolved questions in the management of osteomyelitis of the frontal bone: Is there any place for the conservative operation in osteomyelitis of the frontal bone? Is primary closure ever permissible? Is there any way of telling at the outset of a case whether it is to be of the sequestering, mild, localizing type or whether it is of the fulminating, rapidly spreading type almost sure to be quickly complicated with extradural or subdural abscess, or brain abscess and, unless halted in its tracks, nearly always fatal? Am I advocating an unnecessary, radical operation in the fulminating type of case?

First under consideration is the question of overoperating in the fulminating case. I have never had any sureness of result in these cases until the radical procedure as here described was adopted. The microscopic appearances in bone specimens speak for this type of operation. I shall wait for operators to get as good results with a more conservative operation before I give it up. In the fulminating cases I do not think primary closure of the wound is good practice.

The virulence of osteomyelitis varies in different parts of the country. This sounds like an alibi. A recent English writer reported seven cases of chronic osteomyelitis and stated that he had never seen a fulminating case. Reports in the literature of localizing osteomyelitis cured by conservative operations appear from time to time. A number of years ago a certain pugnacious gentleman stated that there was sequestration in all his cases. He has recently made equally strong statements on another subject—this time in connection with an operation on the ear. His listeners then and now were not in full agreement with him.

I should be willing to vote an antemortem halo to the man who can pick out at the onset and be right 75 per cent of the time which case will localize and not present complications.

As far as I can go in picking a case which suggests a conservative operation, it would be a case having the following history and one which shows the following signs and symptoms: The patient, child or adult, gives a history of trauma to the forehead. There is a localized area of pitting edema of the forehead, perhaps the size of a quarter (24 mm.), and the edema does not involve the front wall of the frontal sinus. The patient is not acutely ill. X-ray examination shows no involvement of the frontal sinus and there are no diploetic veins running from the edematous area. If the disease is of a week's standing the x-rays will probably show some necrosis of the bone under the edematous area.

Such a case would indicate and justify a conservative operation. Before operation pus might be withdrawn from beneath the periosteum where the swelling occurs, the organism identified and its virulence tested on animals. If the surgeon is right in his guess that the infection is of low virulence, a wait of forty-four hours for the result of the inoculation test would do no harm.

In a case of acute infection of the frontal sinus in which there is edema of the skin over the front wall of the sinus and no edema of the skin of the forehead, there is osteomyelitis confined for the moment to the front and posterior walls of the sinus. Microscopic studies have made it certain that in such cases there is infection of the posterior wall of the sinus as well as of the anterior wall. This means to my mind that after a portion of the front wall has been removed a part of the posterior wall should be removed as a routine. The object of this is to learn the condition of the dura and to determine whether or not an extradural abscess is present. When there is a necrotic area on the posterior wall it has long been the custom of operators to remove it, and many an unsuspected extradural abscess has been found in time to prevent osteomyelitis of the frontal bone or a brain abscess. For the patient's safety it is our duty to find out what is going on behind the posterior wall when edema of the anterior wall shows osteomyelitis of this wall.

In a case of mastoid disease, if the operator does not find enough pathologic change in the mastoid process to satisfy him he uncovers the lateral sinus.

A part of the posterior wall of the mastoid process lies against the lateral sinus; the posterior wall of the frontal sinus lies against the dura. One can tell the condition of the lateral sinus only by uncovering it. The same applies to the dura as it lies behind the posterior wall of the frontal sinus.

There are not a few men handling surgical cases who are not temperamentally surgeons. They do not think surgically. They are among those who use a hammer occasionally but never can drive a nail straight.

These sentences are inspired by the entrance of chemotherapy into the picture of osteomyelitis. It may change the picture of the treatment of osteomyelitis markedly. It will require good judgment and full surgical judgment to assign it its final role in this disease.

I have given the picture of osteomyelitis as I see it to date. Tomorrow is in the hands of Fate.

SUMMARY

The veins of the mucous membrane of the frontal sinus are continuous with the diploetic veins of the frontal bone. Compared with the thickness of the frontal

bone, they are of enormous size. In diameter they often measure one third to one half its thickness. The infection originates in the frontal sinus and is carried to the frontal bone by the diploetic veins. The branches of these veins run to the periosteum and cause edema of the periosteum and the skin. They also carry the infection to the dura, and the dura seems to attract the infection even more strongly than the periosteum.

If the infection is halted by a thrombus sufficiently long at any given point, there is necrosis of the bone and the formation of a sequestrum. If the edema extends to the hair line, as it generally does in a fulminating case, the infection in the bone marrow has advanced to the same point. The x-ray examination is positive only after necrosis has begun, and it is not positive until from seven to ten days after the onset of the pitting edema. From the surgical standpoint these are the days of hopeful surgery. If an area of necrosis is shown by x-ray examination or is found at operation, the microscopic examination of numerous specimens of bone in such cases has shown that the bone is actively infected for from 1½ to 2 inches beyond the necrotic area. The progress of the infection along the vein which is chiefly infected can be watched by means of the x-rays.

CONCLUSIONS

The operator who is doing his first operation on osteomyelitis of the skull should expect extradural abscesses as a matter of course. In fact he should expect more than this; he should be on the lookout for a subdural abscess or a brain abscess. The brain abscess, if present, is usually found later, or it comes later as a complication, but it is always threatening and should be watched for even at the first operation.

The more I see of fulminating osteomyelitis of the frontal bone, the more I believe that the whole face of the frontal bone should be removed, from the hair line to the eyebrow, as a routine procedure. Preferably it should be removed in one piece and the operation should start in clean bone; that is, at the hair line. However, if the patient is in poor condition and there is an area of necrosis, it is justifiable to work from the necrotic area outward, the bone being removed from 1 to 1½ inches in all directions from the necrotic area. Further, both frontal sinuses should be opened and the anterior and posterior walls of each sinus removed. I am firmly of the opinion that the lateral limit of the bone flap on each side should be at least the outer angle of each frontal sinus or, better, the outer angular process of the frontal bone on each side. The objection to this extensive removal is the deformity. However, since it has been proved that fully 90 per cent of these deformities can be corrected by modern plastic surgery, the surgeon should not allow his work to be restricted by the question of deformity. If he does, he will lose many or most of his cases of fulminating osteomyelitis of the skull.

The mark of osteomyelitis is written on the patient's brow. Cain, you remember, also had a mark on his brow. In the treatment of his patient let the surgeon beware lest he unwittingly reenact the role of Cain and deserve the same telltale mark when he too, by delayed or inadequate operation, kills his brother. Instalment operating in cases of fulminating osteomyelitis of the frontal bone generally results in the patient being repossessed by his maker.

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ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. MACMILLAN AND MOSHER

DR. ARTHUR C. JONES, Boise, Idaho: Dr. Mosher's comprehensive paper on osteomyelitis of the frontal bone following sinus infection covered all the histology and pathology that I have been unable to find in any of our modern textbooks. I heartily concur with Dr. Mosher when he says that we must meet the fulminating type of osteomyelitis head-on instead of through the unsuccessful rear approach. I recently reported thirteen cases in the majority of which there was a *Staphylococcus albus* or *aureus* infection. I have also encountered the *pneumococcus*. I have found it necessary to remove the entire frontal bone in all my cases. The diploic spaces are tortuous and the osteomyelitis tends to follow the diploic spaces. I remove the osteomyelitic bone as far as the infection extends and then remove normal bone for at least one-half inch. This less radical procedure makes for less disfigurement and takes much less time. Dr. Mosher speaks of the mark of Cain being written on the patient's brow unless the radical procedure is followed. The follow-up pictures of these cases in which the flaps had been pinned back for two or three months have a mark that will tell the whole world that the unfortunate victim has encountered either a buzz saw or a thoroughgoing surgeon. Unfortunately, few of us have a Kazanjian to mop up after us. I envy Dr. Mosher and his staff the privilege of calling in such an eminent radiologist as Dr. Macmillan. Dr. Macmillan has emphasized the necessity of taking at least four views in these cases. Osteomyelitis is about ten days in advance of the x-ray appearances. When the nasofrontal duct becomes completely or partially blocked, the membrane thickened and its secretion retained within the sinus, it is always surprising how little increase there is in the density over the normal. For the most part I use the coronal incision and have been able to uncover as large an area of bone as in the T type of incision. I have had one death in thirteen cases and can see no reason for the T shaped incision, which causes the marked deformity. Of course, the picture of the plastic repair shown by Dr. Macmillan is very complimentary to Dr. Kazanjian. I have seen other pictures with more disfigurement than the ones shown.

DR. JOSEPH E. J. KING, New York: I agree with Dr. Mosher and Dr. Macmillan. There may be a little difference of opinion regarding a few minor details in the operative procedure. I am glad to hear Dr. Macmillan call attention to making x-ray films at short intervals in cases in which one may suspect development of osteomyelitis following disease of the frontal sinus. I have seen cases in which x-ray examination has been delayed so long that it became necessary to remove an enormous portion of the skull. Dr. Fred Law and I have noticed in reviewing films in reverse that a light area representing the point at which osteomyelitis is developing can be seen on the x-ray films at least ten or twelve days before the typical moth-eaten appearance is observed on the films. It is necessary to make only one postero-anterior film every day or two in order to detect this area a number of days before the subcutaneous pus pocket ("Pott's puffy tumor") makes its appearance. This thinned out area is due to involvement of the bone and is observed usually about three-fourths or 1 inch above the supra-orbital ridge, usually on one side. The operation can then be done, as Dr. Jones says, at a much earlier date and can be carried out with removal of less bone. I do not think there should be any discussion of osteomyelitis of the skull without an expression of thanks to Dr. McKenzie of London and Dr. Furstenberg for their splendid achievements in cases of osteomyelitis of the frontal bone. I agree with both that the so-called radical operation is the one of choice and that there is no place for what is termed the "conservative" operation. With the latter there is grave danger of extension of infection, which may be complicated by formation of a brain abscess.

DR. SAMUEL R. SKILLERN JR., Philadelphia: I have never seen a self-limiting type of osteomyelitis of the calvarium. How can one rule out the presence of a subdural abscess in the so-called silent area of the brain, the frontal lobes, unless the dura over this area is exposed? The removal of the pos-

terior sinus plate usually will demonstrate a subdural abscess; if not, at least it will allow any deep collections of pus to work their way upward into the operative field. The timid operator who treats the infected calvarium certainly is running the chance of a rapidly spreading infection of the bone with the likelihood of intradural complications. When one thinks that all such risks are lowered at least 80 per cent by a wide bone resection and that a regeneration with almost a perfect contour of the calvarium can be obtained from transplants of the calvarial bone, it seems to me poor judgment to take such chances. I have modified the Mosher U incision by carrying it through the upper edge of the hair of the eyebrow, then upward into the temporal hair. This incision minimizes the scarring of the forehead. The contents of the temporal fossa are avoided by dissecting the skin forward to the superior temporal ridge before incising the deeper tissues. The vitality of this soft tissue flap is retained by encapsulating it in a hot saline towel. In several cases in which the infection had infiltrated the bone, with or without intracranial complications, any remaining postoperative infection was seemingly controlled in from ten to fifteen days by the use of a bacterial antigen. This antigen was made from *Staphylococcus aureus* and *albus*, with lysed *staphylococcus* and *streptococcus* proteins in solution. I think that Dr. Mosher is ultraconservative in his prolonged open drainage. An early closure of the wound prevents the foreshortening of the flaps, does away with the necessity of pressure bandages and allows the skull to assume its normal shape. Granting that after the closure of the wound a collection of pus occurs, a diagnosis readily can be made as it causes a localized puffy tumor of the soft tissues. I do not hesitate to reopen the entire wound by breaking the newly formed connective tissue. I have had two such cases in which healing promptly occurred without undue disfigurement after the evacuation of the pus, followed by several days of drainage through a stab wound in the replaced flap. It is such a simple surgical procedure to take thin bone chips from the calvarium and plant them in their own environment that it seems to me unnecessary to replace the lost tissues by any foreign material.

DR. CORNELIUS G. DYKE, New York: As a radiologist, I wish to emphasize the importance of obtaining roentgenograms of the frontal and maxillary sinuses in the upright position. The patient must be erect in some cases so that secretions in the frontal sinuses may be visualized, for if the film is made with the patient horizontal no fluid level is formed and no evidence of infection may be visible in the roentgenograms. The lateral view is of considerable importance, and in the relatively few cases of acute frontal osteomyelitis following frontal sinusitis that have been seen at the Neurological Institute (about one year) the lateral view when slightly underexposed may show some localized edema of the scalp or slight decalcification of the bone in ensuing osteomyelitis. It should be emphasized that the complications of acute osteomyelitis of the frontal bone secondary to frontal sinusitis are uncommon, for, as Dr. Macmillan has stated, in twenty years he has encountered only eighty-six cases at the Massachusetts Eye and Ear Infirmary; in other words, about four cases a year in an institution that has an extremely active eye, ear, nose and throat service. However, only in this kind of hospital is it possible to collect a sufficient number of cases to determine which method of treatment is the best. In how many of the last sixteen cases, in which there was a mortality of 25 per cent, had sulfanilamide or one of the related compounds been administered?

DR. HARRIS P. MOSHER, Boston: I congratulate Dr. Jones on having microscopic sight in being able to tell normal from diseased bone. I have not acquired that facility yet. His cases, to my mind, are not of the fulminating type. I am ready to change my operation technic and change in any way that the adequate experience of others dictates. Dr. King supported me from the general surgical standpoint, and I have said a few things about the lack of the general surgical principles among some specialists. I was glad to hear Dr. King say that the patient can bleed to death if one is not careful to stop the bleeding as one is turning up the flap. I would agree with what he said about obliterating the frontal sinuses. If one does not obliterate it in these cases, one is

going to have trouble afterward, and the way to obliterate it is to take off both anterior and posterior walls. As Dr. Skillern says that I may be overconservative; if so, it is for him to prove it. He referred to chemotherapy. This is coming in. A note has been handed to me that sulfathiazole as a powder can be used in dressings. About Dr. Skillern's use of bone chips, this method was used in the World War and is worth trying again. Dr. Macmillan said that the x-rays were outmoded in osteomyelitis. I do not agree to that. Let me leave these thoughts with you: If you can find out which is a nonfulminating case, so much the better. Treat it accordingly. But watch the diploic veins. If one vein enlarges, showing that it is carrying infection, the bone carrying it should be removed. Especially watch the veins at the external angle of the frontal sinus. There have been some tragedies lately where these have not been watched.

DR. A. S. MACMILLAN, Boston: As Dr. Wilinsky in New York has said with regard to osteomyelitis being a limited disease, it is very often limited, but it is limited by the death of the patient. Within the last month, three cases of osteomyelitis have come in and have been treated by Dr. Champ Lyons at the Massachusetts General Hospital, in which he used heparin to prevent thrombophlebitis by increasing the clotting time, and sulfathiazole as a chemotherapeutic agent. His results in these cases, so far, have been startling, and we should watch for his paper on this subject.

DIABETES INSIPIDUS

TREATED BY THE SUBCUTANEOUS ADMINISTRATION
OF A SUSPENSION OF PITRESSIN TANNATE
IN OIL

JAMES A. GREENE, M.D.

AND

L. E. JANUARY, M.D.

IOWA CITY

It has been known for several years that solution of posterior pituitary controls the manifestations of diabetes insipidus. The pioneer work of Farini and Ceccaroni¹ and of von den Velden² demonstrated the efficacy of the hypodermic administration of solution of posterior pituitary, and Blumgart³ showed that spraying the solution into the nose was also effective. Furthermore, intranasal insufflation of the powdered whole gland controls the symptoms, as was shown by André and Lucie Choay.⁴ It was found by Kamm and his co-workers⁵ that pitressin contained the active antidiuretic substance.

The subcutaneous administration of solution of posterior pituitary or pitressin appears to be the most effective method of treatment. Warkany and Mitchell⁶ quoted Nobécourt and Ducas's statement that it is effective in 95 per cent of the cases. Certain very disagreeable side effects, however, such as pallor, diarrhea, palpitation, headache, nausea, intestinal cramps and increased blood pressure often occur. These side effects and the necessity of giving the injections very frequently make the prolonged use of such therapy impracticable.

From the Department of Internal Medicine, State University of Iowa College of Medicine.

1. Farini, A., and Ceccaroni, B.: *Influenza degli estratti ipofisari sull'eliminazione dell'acido ippurico*, Gazz. d. osp. 34: 879, 1913.

2. von den Velden, R.: *Die Nierenwirkung von Hypophysenextrakten beim Menschen*, Berl. klin. Wchnschr. 50: 2083, 1913.

3. Blumgart, H. L.: *The Antidiuretic Effect of Pituitary Extract Applied Intranasally in a Case of Diabetes Insipidus*, Arch. Int. Med. 29: 508 (April) 1922.

4. Choay, André, and Choay, Lucie: *Traitement du diabetes insipide par des inhalations d'extrait de lobe postérieur d'hypophyse*, Rev. neurol. 11: 264, 1924.

5. Kamm, O.; Aldrich, T. B.; Grote, I. W.; Rowe, L. W., and Bugbee, E. P.: *Active Principles of the Posterior Lobe of the Pituitary Gland*, J. Am. Chem. Soc. 50: 573, 1928.

6. Warkany, Josef, and Mitchell, A. G.: *Diabetes Insipidus in Children: Critical Review of Etiology, Diagnosis, and Treatment with a Report of Four Cases*, Am. J. Dis. Child. 57: 603 (March) 1939.

Nasal insufflation of the powdered whole gland is often more convenient and less painful, but in the severe case it may be required from six to eight times a day and at least one time during the night.

Methods to produce slow absorption of hormones have been shown to be desirable in certain endocrine deficiencies. It seems to us that diabetes insipidus is such a disease. We have been able to find only two reports of efforts to prolong the effect of the antidiuretic principle of the posterior pituitary gland. Wankmüller⁷ administered hypodermically a posterior pituitary preparation dispersed in vegetable and animal oil to three patients with diabetes insipidus. A single injection controlled the symptoms for from three to five days. The injection twice a week of 1 cc. of a water-in-oil emulsion of concentrated liquid pituitary extract prepared by Court and Taylor⁸ controlled the symptoms in one case.

The present report is concerned with the effect of the subcutaneous administration of pitressin tannate suspended in oil,⁹ on three cats with experimentally produced diabetes insipidus,¹⁰ on two patients with the idiopathic form of diabetes insipidus and on one with diabetes insipidus which was thought to be a manifestation of lipoid granuloma. Pitressin tannate is a water-insoluble chemical combination of a pressor fraction of the posterior lobe of the pituitary gland with tannic acid. The pressor fraction is precipitated with tannic acid, and the precipitate is removed by filtration and washed and dried, all under aseptic conditions. Five pressor units of pitressin tannate are suspended in each cubic centimeter of peanut oil. The p_H of the solution is that of oil. The antidiuretic effect is one of the subjects of this report. In the cats, only the effect on

It is to be noted from table 1, which shows the effect of the subcutaneous administration of the material to cats, that an injection reduced the urinary output and increased the urinary specific gravity for from three to five days. Sufficient time was allowed between injections for the urinary output and specific gravity to

TABLE 3.—Comparative Effect of No Therapy, Intranasal Insufflation of Powdered Whole Gland, and Pitressin Tannate in Oil on Patient 1

Experimental Period	No. Days	Average Intake, Cc.	Average Output, Cc.	Average Specific Gravity	Urea Clearance	Average Blood Pressure
No therapy.....	3	13,170	13,815	1.000	67%	115/70
Powdered whole gland, 25 mg. 4 times daily by intranasal insufflation...	5	1,930	1,380	1.013	101%	116/60
Pitressin tannate in oil, 1 cc. every other day.....	8	1,430	1,155	1.021	158%	110/60

TABLE 4.—Comparative Effect of No Therapy, Solution of Posterior Pituitary, Pitressin and Pitressin Tannate in Oil on Patient 2

Experimental Period	No. Days	Average Intake, Cc.	Average Output, Cc.	Average Specific Gravity	Urea Clearance	Average Blood Pressure
No therapy.....	4	11,300	11,925	1.000	132%	120/60
Posterior pituitary solution, 1 cc. twice daily....	2	4,200	5,250	1.004	.....	120/60
Pitressin, 1 cc. twice daily.....	5	3,600	3,355	1.006	.....	120/66
Pitressin, 1 cc. three times daily.....	5	2,440	2,520	1.010	.....	126/76
Pitressin tannate in oil, 1 cc. every other day.....	9	2,725	2,970	1.013	118%	126/66
Pitressin tannate in oil, 1.5 cc. every other day...	8	2,410	2,065	1.018	138%	128/60

TABLE 1.—Effect of 1 Cc. of Pitressin Tannate in Oil on Cats with Experimentally Produced Diabetes Insipidus

Cat	Control		1		2	
	No. Days	Average Output, Cc.	Average Specific Gravity	Days Active	Average Output, Cc.	Average Specific Gravity
1	7	429	1.006	3	210	1.019
2	7	506	1.008	5	143	1.030
3	7	856	1.004	3	187	1.025
					162	1.024
					162	1.026
					228	1.020

TABLE 2.—Total Duration of the Effect of 1 Cc. of Pitressin Tannate in Oil on a Cat with Experimentally Produced Diabetes Insipidus

Control: Average urine output, 856 cc. Average specific gravity, 1.004			
3/14/40: Pitressin tannate in oil, 1 cc.		Urine, Cc.	Specific Gravity
3/14/40.....		780	1.015
3/15/40.....		200	1.030
3/16/40.....		135	1.025
3/17/40.....		225	1.020
3/18/40.....		525	1.003
3/19/40.....		660	1.004
3/20/40.....		700	1.005

the urinary output and specific gravity was ascertained, but in the patients the effect on the fluid intake, urinary output and specific gravity, blood pressure and urea clearance was studied.

7. Wankmüller, R.: Effectiveness of Tonedphen (Posterior Pituitary Preparation) Administered Parenterally in Depot Form in Diabetes Insipidus. *Klin. Wchnschr.* 18: 566 (April 22) 1939.

8. Court, Donald, and Taylor, S. A.: Diabetes Insipidus Treated by Slowly Acting Pituitary Emulsion, *Proc. Roy. Soc. Med.* 32: 1203 (Aug.) 1939.

9. Supplied by Parke, Davis & Co.

10. Available through Dr. W. R. Ingram, Department of Anatomy, State University of Iowa College of Medicine.

return to the control level. Actually the effect was even more prolonged, as demonstrated in table 2, which shows the daily urinary output and specific gravity in the case of cat 3 of table 1, following the administration of pitressin tannate in oil. The rise in specific gravity during the first day was greater than the decline in the urinary output, whereas, as the effect subsided, the specific gravity declined more rapidly than the urinary output increased. Some effect was demonstrable, therefore, in this animal for seven days, although the maximum effect occurred for only three days. The same was true for the other animals, although to a lesser degree.

Of the patients observed, the first was a boy 16 years of age whose symptoms had been controlled previously by hypodermic injections of solution of posterior pituitary and later by the intranasal insufflation of 25 mg. of the powdered whole gland four times daily. The daily urine volume during insufflation treatment varied from 2,000 to 3,000 cc., and the specific gravity from 1.010 to 1.015. It is to be noted from table 3, which compares the effect of intranasal insufflation of the powdered whole gland with subcutaneous administration of pitressin tannate in oil on this patient, that the manifestations were better controlled with the latter method of treatment. Not shown in the table is the duration of the effect of the administration of 1 cc. of this material. This varied from forty-eight to eighty-two hours and averaged fifty-seven hours. During the eight days of treatment covered by table 3, injections were repeated before the complete disappearance of the effect of the previous one. After the patient left the hospital the injections were repeated only as often as necessary to control his symptoms. He reports that

1 cc. is required every sixty to seventy-two hours. There were no side effects from the use of pitressin tannate in oil, although the manifestations of the syndrome were controlled more completely. The arterial pressure was not increased but there was an apparent increase of the urea clearance.

The second patient was a boy aged 17 years who was refractive to the intranasal insufflation of the powdered whole gland even when as much as 200 mg. was administered at one time. His symptoms were adequately controlled by an injection of 1 cc. of solution of posterior pituitary every twelve hours. The resulting headache, however, was so pronounced that after one year he discontinued the drug. The effect of administering solution of posterior pituitary hypodermically in 1 cc. doses two times a day, and of pitressin in 1 cc. doses two and three times a day, compared with the effect of administering pitressin tannate in oil in 1 and 1.5 cc. doses every other day, is shown in table 4. The effect of 1 cc. of pitressin tannate in oil lasted from thirty to fifty-three hours and averaged forty-four hours. The duration of the effect was not noticeably prolonged by increasing the dose to 1.5 cc. but the symptoms were better controlled. The symptoms were as well controlled when pitressin tannate in oil was administered every other day as when three injections of pitressin were given daily. There was no appreciable effect on the blood pressure or urea clearance, and headache did not occur. After the patient left the hospital the symptoms were controlled satisfactorily by an injection of 1 cc. every forty-eight to fifty-two hours.

The third patient was a woman aged 39 who was also refractive to the intranasal insufflation of the powdered whole gland, but her symptoms were well controlled by the injection of 1 cc. of solution of posterior pituitary every twelve hours. Pallor, nervousness and the passage of several watery stools frequently followed an injection. The results of the use of pitressin tannate in oil are shown in table 5. The duration of the effect of 1 cc. varied from thirty-two to forty-four hours and averaged thirty-seven hours, whereas 2 cc. prolonged the effect to from sixty-four to sixty-eight and one half hours. A very disagreeable sense of

hypodermic needle for the injections. There was no reaction at the site of the injections. Nevertheless it is advisable to vary the site of the injections. The patients were easily taught to administer the preparation themselves.

SUMMARY

Pitressin tannate in oil was administered to three patients with diabetes insipidus and to three cats with experimentally produced diabetes insipidus. The duration of the effect was ascertained, and the efficacy of this method of treatment was compared with that of other preparations of the posterior pituitary gland.

The duration of the effect in the cats varied from three to seven days, and in the patients from thirty to eighty-two hours. The effect on the manifestations of the disease in the patients was equal to that of other preparations of the posterior pituitary gland and there were no disagreeable side effects.

THE CHEMICAL AND MECHANICAL PREVENTION OF SYPHILIS AND GONORRHEA

PRELIMINARY STATEMENT BY THE SPECIAL JOINT
COMMITTEE APPOINTED BY THE AMERICAN
SOCIAL HYGIENE ASSOCIATION AND
THE UNITED STATES PUBLIC
HEALTH SERVICE

H. H. HAZEN, M.D., WASHINGTON, D. C., CHAIRMAN; IRA V. HISCOCK, C.P.H., Sc.D., NEW HAVEN, CONN.; P. S. PELOUZE, M.D., PHILADELPHIA; WILLIAM F. SNOW, M.D., NEW YORK; HANS ZINSSER, M.D., BOSTON; RAY H. EVERETT, L.L.B., WASHINGTON, D. C., SECRETARY.

The Committee was requested to review the history and present status of the prevention of syphilis and gonorrhea by chemical and mechanical means and to make such recommendations as seemed desirable at the present time. The Committee has had several meetings in New York and Washington, has reviewed the published material dealing with its field of study and has heard testimony from representative members of the Army Medical Corps, the Navy Medical Corps, the United States Public Health Service, state health officers, the medical profession, representatives of Negro medical and public health groups, medical schools, voluntary health organizations, religious organizations, educational organizations, social welfare agencies and civic organizations.

The Committee is cognizant of the fact that chemical and mechanical prophylaxis is only one phase of preventive medicine. The prevention of syphilis and gonorrhea by chemical or mechanical means is supplementary to and not a substitute for the prophylaxis of these diseases by educational measures which employ ethical and religious motives. Nor does chemical or mechanical prophylaxis justify any relaxation of efforts to reduce to a minimum exposure to infection by discouragement of prostitution and other forms of sexual promiscuity. In the case of syphilis and gonorrhea, as with other communicable diseases, the best and surest method of prevention of infection is the avoidance of exposure. Educational, religious, sociologic and legal activities which tend to prevent exposure to infection are of great importance. At the same time, however, the Committee is fully aware of the fact that sexual promiscuity is a very important factor in their

TABLE 5.—Effect of Pitressin Tannate in Oil on Patient 3

Experimental Period	No. Days	Average Intake, Cc.	Average Output, Cc.	Average Specific Gravity	Urea Clearance	Average Blood Pressure
No therapy.....	3	6,530	7,250	1.001	82%	130/80
Pitressin tannate in oil, 1 cc.....	9	2,060	1,130	1.022	97%	118/76
Pitressin tannate in oil, 2 cc.....	7	2,060	1,470	1.021	88%	.....

"uneasiness" was experienced following the administration of 2 cc. Unfortunately, no measurements of the blood pressure were made during this period of study. No disagreeable side effects were noted after a dose of 1 cc. and there was no appreciable effect on the blood pressure or urea clearance.¹¹

The viscosity of the oil at room temperature requires that the ampule be immersed in warm water for several minutes and thoroughly shaken before the material is withdrawn into the syringe. It is preferable to use a 20 gage needle for filling the syringe and an ordinary

11. Since this paper was submitted for publication, two additional patients with idiopathic diabetes insipidus have been treated. The first was a 17 year old girl and the second a 24 year old man. In the first case the symptoms were controlled for from fifty-one to sixty-eight and one half hours (average, fifty-six hours) by 1 cc. of pitressin tannate in oil and, in the second, for from fifty to seventy hours (average, fifty-five hours).

spread. To decrease the number of carriers among this group of men and women, chemical and mechanical prophylaxis is necessary and hence is complementary to educational measures.

The place of chemical and mechanical preventive measures is at the point where educational, religious, social and legal efforts have failed to prevent exposure to infection. At that point preventive medicine offers reasonably efficient methods of prevention, which, if correctly applied, will in the majority of instances prevent the exposed person from becoming infected and from becoming a possible source of infection to those with whom he may later have contact. Thus not only one individual but that individual's family and community may be relieved of the burdens—medical, social and economic—of syphilis and gonorrhea. The employment of chemical and mechanical prophylaxis will preserve the efficiency of men required for defense or service of the nation in time of peace or of war. This being the case, it becomes the moral obligation of sanitarians to urge the wide dissemination of all available knowledge regarding such procedures.

After carefully reviewing the available scientific data as to the efficiency of various means of chemical and mechanical prophylaxis, the Committee makes the following specific recommendations:

THE CHEMICAL AND MECHANICAL PREVENTION OF SYPHILIS AND GONORRHEA¹

1. Safest method.
 - A. Use a condom of standard type.
 - B. Thoroughly wash the genitals and adjacent parts with soap and water as soon as possible (the sooner the better, but within one hour at most) after removal of the condom.
2. In the absence of a condom.
 - A. Thoroughly wash with soap and hot water as already described.
 - B. After urination, inject 6 cc. of 2 per cent strong protein silver solution, or other efficient, nonirritating germicidal solution into the urethra and hold for five minutes.
 - C. Rub 33 per cent ointment of mild mercurous chloride (calomel ointment) into the genitals and adjacent parts.

COMMENT²

The habit of cleanliness materially reduces the risk of infection. For the proper application of 2 B and C, skilled attention and use of a syringe are necessary. Prophylactic treatment of this type can be given by physicians, by some clinics, and in prophylactic stations where they exist.

The Committee emphasizes the fact that the foregoing suggested preventive measures are not 100 per cent successful. Their efficacy depends first on the reliability of the materials used. A defective condom does not give the same degree of protection as a sound article. The strong protein silver solution or the mild mercurous chloride may not be of the proper strength or may be inactive. Second, washing and application of chemicals may be delayed too long after exposure. Drunkenness may prevent correct application of any of these methods. It may be stated, however, that when these methods are followed correctly they will in the majority of instances prevent infection with syphilis or gonorrhea.

The medical profession and public health agencies, both official and voluntary, bear a heavy responsibility in the matter of the prevention of syphilis and gonorrhea by chemical and mechanical means.

Since these methods are efficacious they would, if widely understood and correctly utilized by those who expose themselves to the danger of infection, result in a great diminution of syphilis and gonorrhea and would thereby greatly reduce personal, family and community disasters and the economic losses that result from these infections.

It seems clear, therefore, that health education with regard to syphilis and gonorrhea should include simple, frank and explicit directions as to chemical and mechanical prophylaxis. This information should be included in its proper setting and in appropriate language.

It seems apparent also that, in addition to instructing the public regarding this preventive medical method, civilian, military and naval, medical and health authorities have the obligation to provide the facilities through which chemical and mechanical prophylaxis may be made available when and where needed. The authorities also have the responsibility for preventing the commission of fraud through the sale of worthless products to the public for the prevention of these diseases.

Finally the Committee is impressed with the fact that there are many unsolved and administrative problems within the scope of chemical and mechanical prophylaxis and the provision of adequate facilities for these procedures. It is considered that research in this field should be continued.

Clinical Notes, Suggestions and New Instruments

ASPIRATION OF SPUTUM FROM ADULTS

W. J. AUGER, M.D., TORONTO

During the past three years a new aspiration method of obtaining sputum at the Hospital for Sick Children has been in use. With one attempt it is usually possible to obtain sufficient sputum from the larynx or nasopharynx for direct examination and cultural purposes. The apparatus consists of a glass syringe, a catheter and a simple valve arrangement which permits powerful intermittent suction. By use of this method it has been learned that in children the nasopharynx is an ideal source for obtaining sputum for typing pneumococci in early cases of pneumococcal pneumonia, while sputum from the larynx is more suitable for examination in cases of tuberculosis, whooping cough or pneumonia due to a mixed infection.¹ The type of pneumococcus found in the nasopharynx has agreed in most cases with the type found in exudates, blood cultures and lung cultures at postmortem examination whenever these examinations have been possible. The only difficulty with this method is that in about 12 per cent of cases two types of pneumococci are to be encountered on direct examination, one type probably acting in the role of pathogen. Occasionally three types are to be found.

In view of these observations a study was made of expectoration of pneumonia patients among adults at the Toronto General Hospital through the courtesy of Dr. Duncan Graham. There were two objectives: The first was to learn whether sputum was obtainable from those patients who said that they could not cough or expectorate. This is frequently the case when the patient is too weak or irrational. Too often the

¹ Working under a grant from the Banting Research Foundation in pneumonia research in the Department of Pathology and Bacteriology at the Hospital for Sick Children.

J. Auger, W. J.: An Original Method of Obtaining Sputum from Infants and Children with Reference to the Incidence of Pneumococci in the Nasopharynx, *J. Pediat.* 15: 640 (Nov.) 1939.

¹ The directions for the prevention of syphilis and gonorrhea apply to the prevention of all other venereal diseases as well.

² In this initial report the Committee has purposely avoided going into detail, believing that only general principles should be discussed. In the full report detailed methods will be given at length.

technician complains to the intern that the specimen received was not expectorated but was salivated. The latter problem is of interest in the study not only of pneumonia but also of tuberculosis. The second objective was to learn whether secretion from the nasopharynx would yield large numbers of pneumococci as in children and whether this method of obtaining sputum offered any short cut in the early diagnosis of pneumococcal pneumonia.

METHOD

Thirteen patients with pneumonia from the wards of the Toronto General Hospital were chosen over a period extending from April 1 to May 30, 1939. These were patients from whom the intern in charge was unable to obtain any sputum or, if he did, the sputum obtained was found in the laboratory to be unsuitable for direct examination. On notification of such cases, I attended the patient and obtained specimens of secretion from both the larynx and the nasopharynx by the aspiration method. The sputum was examined directly by smear and for the quelling phenomenon. It was then cultured on a blood agar plate, carbon dioxide being used.² (The mouse cultural method was not used.)

ASPIRATION METHOD

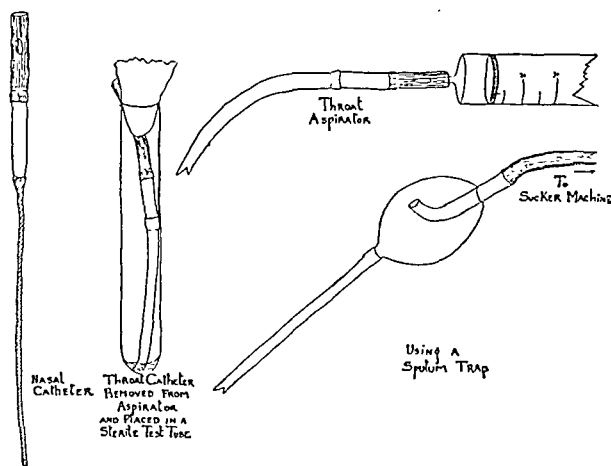
The construction and operation of an "aspirator" has already been described in a pediatric journal;¹ a short review will be presented here. The operation is essentially the same for adults except that more cooperation is expected, and the assistance of a nurse is not usually necessary. The apparatus consists of a 50 cc. syringe, a 2 inch piece of soft rubber tubing of three-sixteenths inch inside diameter with a small hole cut in one side (to act as a simple finger valve), a 2 inch piece of glass tubing of one-fourth inch outside diameter to act as an indicator for the sputum, and a catheter designed for either nasal or pharyngeal passage (see diagrams). All these materials can be obtained in any hospital supply room.

By the nasopharyngeal method the catheter (a number 9 or 10 French catheter) is inserted into the nasopharynx until it is judged to be in the "adenoid" area. Suction is commenced by having the operator hold the barrel of the syringe in the left hand and with the forefinger cover the window of the soft rubber tubing which connects the syringe with the glass tubing. The piston of the syringe is withdrawn with the right hand. At the end of the outstroke the finger is removed from the hole in the rubber tubing and the piston is shoved back into the syringe. In this manner the air is short circuited and the sputum is not returned into the nasopharynx. After repeated intermittent suction in this manner, the sputum will be seen to rise into the glass connection. Then the catheter is removed from the nose and placed in a sterile test tube. The sputum is forcibly ejected into the test tube by reversing the process, namely the forefinger covers the valve on the instroke of the piston and is removed on the outstroke. The thumb and forefinger of the right hand should grip some of the piston beyond the handle to prevent driving the piston through the end of the barrel during the process of ejection. The catheter is left in the test tube and is taken to the laboratory for further examination. The nasal method can be used to obtain sputum from the larynx, but the bore of the catheter is small and liable to be obstructed by thick sputum.

The laryngeal method employs a catheter of fairly stiff rubber tubing 4 by 5 inches long and of one-eighth inch inside diameter with a notched tip. This catheter allows for the collection of large amounts of sputum. The suction principle is essentially the same as in the nasopharyngeal method but is performed faster and more energetically. Some experience is required on the part of the operator to achieve best results. The patient is asked to open his mouth and cough. With the operator holding the syringe and valve in the left hand, the right hand at first directs the catheter to the base of the tongue while the patient is coughing. When the catheter is in position with its tip at the base of the tongue and above the opening of the larynx, the right hand changes position and pulls and pushes the piston as in the nasopharyngeal method. When the catheter is heard

to "catch" on the expectoration or when sputum is seen to rise into the glass connection, the catheter is removed and the sputum ejected into a sterile test tube. This procedure may have to be repeated before sufficient sputum can be obtained. This method is more irritating to the patient but at the same time one is sure that the sputum has come from the larynx or the trachea. In some cases the catheter does not catch any sputum but the patient is able to expectorate afterward, owing to the irritation of the cough reflex. This method should be done about two hours after meals. A cellophane mask covering the face should be worn by the operator.

A simpler method of aspirating sputum from the larynx is to use a sputum trap in conjunction with a machine suction apparatus. The sputum trap is constructed of an obstetric bulb with a 5 to 6 inch throat catheter attached to its lower end and the tube from a suction machine to the upper end. The catheter is directed to the back of the throat with the right hand, the left hand being left free to use a tongue depressor (the operator standing to the right of the patient). The sputum is aspirated in large quantities into the glass obstetric bulb and is removed from the bulb in the laboratory by attaching syringe and finger valve to the upper end and drawing and expelling saline solution in and out of the bulb. This method requires little experience, and its only disadvantage is in the requirement of a cumbersome machine suction apparatus. One



The assembled nasal and throat catheters and their uses.

distinct advantage of this technic, however, is that it leaves the left hand free to retract the tongue, so that the right hand can more accurately direct the tip of the catheter. This method has only recently been devised and used but has so far proved very satisfactory.

RESULTS

A comparison of the secretions from the nasopharynx with those from the larynx of thirteen adults with pneumonia was made. No conclusions were drawn as to the probable etiology of the respective pneumonias because of the small number in the series. The pathogenic bacteria recorded merely indicated their presence in nasal and laryngeal secretions.

In only two cases was the patient totally unable to expectorate voluntarily. In the other cases the sputum was insufficient because it consisted more of saliva than of purulent matter. In these cases the adult resembles the child and confuses expectoration with salivation. But, with the aspiration method, sputum with a minimum of saliva was always obtainable in all thirteen cases whether the nasal or the laryngeal route was used. The sputum was always sufficient for direct smear, Neufeld test and cultural methods.

The laryngeal method seems to be the easiest and most satisfactory for obtaining large amounts of sputum, particularly when the patient is weak or irrational. This is in contrast to children, in whom the nasopharynx is usually full of purulent secretion. It may be explained by the fact that the adult is uncomfortable whenever there is nasal obstruction and is continually blowing

2. Auger, W. J.: A New Method of Culturing Sputum on Solid Media Using Carbon Dioxide for the Isolation of Pneumococci, *Brit. J. Exper. Path.* 20: 439 (Dec.) 1939.

his nose or clearing his nasopharynx to rid himself of this feeling. Because large amounts of sputum relatively free from saliva were obtained from the larynx in patients when voluntary expectoration had failed, this method is recommended for getting suitable sputum from tuberculous patients. The laryngeal method has been particularly useful in infants and children in this respect.

In only one case were pneumococci more numerous in the nasopharyngeal secretions than in the laryngeal. There were eight cases of pneumonia with pneumococci in the sputum. In most cases the type of pneumococcus or other pathogenic bacteria found in the back of the nose agreed with that found in the larynx and also in about equal numbers. In children, on the other hand, in cases of early pneumococcal pneumonia, the nasopharyngeal secretions have been found to contain larger numbers of pneumococci than the laryngeal secretions.¹ This may be due in part to the relative absence of adenoid tissue in the adult. It is felt however that, if a stiff catheter with a curve to reach the roof of the nasopharynx could be constructed and inserted, perhaps foci of infection in the sinus recesses of the adult nose would yield interesting information. The secretions from the nose were usually freer of mouth organisms than laryngeal secretions. This is due to the throat aspirator unavoidably picking up mucus from the back of the throat. However, this can be partially remedied by careful washing of the sputum. In one case no likely etiologic organisms were isolated. The patient had received sulfapyridine for thirty-six hours before the sputum was aspirated. This illustrates the value of obtaining sputum before chemotherapy is started.

COMMENT

This study is admittedly based on a small number of cases and no conclusions should be made without further trial; nevertheless the ease with which large amounts of sputum could be aspirated from the larynx of patients who found it difficult to expectorate voluntarily seemed to justify the publication of this method. Since considerable bacteriologic experience is necessary for the examination of the sputum and some practical experience is required to operate the laryngeal aspirator, it is recommended that one person should both obtain and examine the sputum. This is to insure that suitable sputum reaches the laboratory.

With the advent of chemotherapy in the treatment of pneumonia there is a tendency to ignore sputum examination. While sulfapyridine may be administered without regard to the type of pneumococcus, for prognostic evaluation the type of pneumococcus may be of significance. In cases of streptococcal pneumonia sulfanilamide may be the drug of choice. In cases of pneumonia due to a staphylococcus or to *Bacillus influenzae*, the treatment and outlook are uncertain. This would indicate that early sputum examination is essential for prognosis and research in the treatment of pneumonia. On the other hand, proper sputum is essential for laboratory examination. A direct smear from purulent matter can in most cases anticipate the results from the cultures. Much time and labor may be saved in the laboratory by care in obtaining sputum at the bedside.

SUMMARY

A brief study was carried out on thirteen adults with pneumonia who reputedly could not cough or bring up satisfactory sputum for examination.

In all thirteen cases sufficient sputum was obtainable from either the larynx or the nasopharynx by the use of the aspiration method.

No advantage was found in nasopharyngeal secretions as compared with secretions from the larynx in the typing of pneumococci in pneumonia among adults.

The laryngeal aspiration method of collecting sputum, whether obtained by syringe and finger valve or by a sputum trap and machine suction, has been suggested for adults when voluntary efforts at expectoration have failed. This method is also recommended for obtaining sputum from tuberculous patients.

It is suggested that the person who examines the sputum in the laboratory should obtain the sputum.

ACUTE INFECTIOUS POLYNEURONITIS FOLLOWING PNEUMONIA

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A rapidly extending paralysis ultimately involving all four extremities in a flaccid paralysis developed suddenly on the fourth day following the crisis of an uneventful case of bronchopneumonia. This infrequent sequel, difficult of recognition at its inception, is hereby reported:

REPORT OF CASE

History.—S. B., a boy aged 16, who entered the Jewish Hospital of Brooklyn on Dec. 4, 1938, had always enjoyed good health except for an uncomplicated scarlet fever at the age of 10. Six days before entering the hospital he complained of headache, weakness and lassitude. The temperature rose to 104 F. and he began to cough without expectoration. There was no chill. The temperature ranged between 100 and 104 F. daily. The day before admission to the hospital, he complained of pain in the left side of the chest on deep breathing and on coughing.

Examination.—On admission the patient was well developed and did not appear very ill; there was no dyspnea, cyanosis or jaundice. The pharynx was deeply injected; the tongue was moist and slightly coated. Some impaired resonance to percussion was obtained below the angle of the left scapula, and moist rales were evident at the end of inspiration at this site. The heart appeared normal, the abdomen was soft and the viscera were not palpable. There was no nuchal rigidity, no alteration of the tendon or superficial reflexes, no sensory changes and no cranial nerve palsies.

Course.—The temperature ranged between 102 and 103 F. daily. There was not much cough and occasionally he would raise a thick grayish sputum. Repeated examinations of the sputum showed no pneumococci; no hemolytic streptococci were obtained on culture; nondescript, indifferent streptococci were found. On the second day following his admission, dulness, bronchial breathing and many crepitant rales were noted in the right axilla and right interscapular region. The left lung was clear. X-ray study at this time showed bronchopneumonic infiltration of the base of the right lobe. Epistaxis occurred on the second and third day of his hospital stay.

In the absence of any specific typing and because no disturbing symptoms had arisen, he was given no specific medication, nor had any medication been taken before admission. The elevation of temperature continued for four days; on the fifth day it precipitately dropped from 103.4 F. to normal, and it remained normal thereafter. Blood counts during this period showed a red blood cell count of 4,800,000 and a leukocyte count of 9,000; there were 60 per cent polymorphonuclear cells, 20 per cent band forms and 20 per cent lymphocytes. Urine examinations showed no pathologic features.

Four days after the temperature had dropped to normal (fifteen days after the onset of pneumonia) he suddenly found himself unable to raise his arms sufficiently to feed himself. Examination showed weakness of both arms, especially the proximal muscle groups. The grip of each hand was diminished; the left was involved to a greater extent than the right. The following day it was noted that the pupils were irregular; they reacted promptly to light and in accommodation. The eyegrounds showed slight haziness of the disks. Slight lateral nystagmus was present, but it was easily exhausted. There was definite weakness of all four extremities, more marked in the shoulder and pelvic girdles. All the deep reflexes were lost. The cremasteric and abdominal reflexes were lost. There were no alterations in sensation or muscle tenderness. The patient did not complain of pain.

A spinal tap was performed on December 15 (two days after the onset of the paralysis). The initial pressure was 110 mm. There was a sharp rise and fall of the initial pressure with successive straining, jugular pressure and abdominal pressure; 8 cc. of spinal fluid was removed. It appeared crystal clear. There were 8 lymphocytes; the Wassermann and colloidal gold tests were negative; the chemical analysis showed a total protein

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of 42 mg. and a sugar content of 63 mg. per hundred cubic centimeters. No organisms were grown on culture of the spinal fluid. The following day, December 16, he complained of pain in both shoulders and arms and numbness and tingling of both hands. But little voluntary action remained in the extremities. The palate was noted to deviate slightly to the left, but this cleared in two days. At this time some pharyngeal weakness was evident as well as some weakness of the right facial muscles. Tests for electrical reactions of degeneration (faradic current) were performed on all muscles and were found within normal limits.

During the following week he complained of considerable pain in both arms and shoulders; some atrophy was now apparent in most of the muscles but appeared to be most marked in the hands. No fibrillary twitchings were noted. The pharyngeal weakness and the slight facial palsy cleared by the end of the third week.

On January 7, twenty-five days after the onset of the paralysis, the pain in both shoulders and arms was less. He was mentally clear. There was no nuchal rigidity; the pupils were slightly irregular. The eye grounds were normal; there were no cranial nerve palsies. Some muscle tenderness was noted. There were no fibrillary twitchings; muscular atrophy was slightly more marked. The tendon reflexes of the upper extremities and the abdominal reflexes were gone, the cremasteric reflexes and tendon reflexes of the lower extremities had returned to normal. There were no sensory disturbances. At no time was there any loss of sphincteric control. An orthopedic examination at this time revealed the following details: In the right upper extremity there were some atrophy of the deltoid, marked weakness of the external rotators and moderate weakness of the internal rotators of the arm; the triceps and the biceps action were reduced 50 per cent; there was marked loss of dorsiflexion at the wrist; flexion at the wrist was good; there were complete loss of extension of the fingers and marked weakness of the flexors of the fingers. In the left upper extremity there were marked weakness and some atrophy of the shoulder and arm; the external rotators were almost completely paralyzed but the internal rotators functioned about 60 per cent normally; the biceps and the triceps functioned about 40 per cent of normal. There were complete loss of extension of the fingers and considerable loss of flexion of the fingers. The lower extremities showed a slight degree of atrophy; flexion of the thighs was weak, abduction and adduction were good; the function of both knees and ankles was good; bilateral pes cavus was evident; the toes were retracted.

Subsequent Course.—Improvement progressed slowly. After the sixth week he no longer complained of pain, although some muscle tenderness was still evident. During the seventh week he was able to sit in a chair; during the following week he could walk with assistance. He was discharged on Feb. 5, 1939, for convalescent care and rehabilitation. At the end of the third month he was again able to feed himself and walk without assistance.

Treatment.—Twenty-four hours after the onset of paralysis, thiaminehydrochloride therapy was begun; he received 6.6 mg. intramuscularly four times daily for the first ten days; for the next two months he received a similar dose by mouth four times a day. A trial course of triple typhoid vaccine was given without appreciable benefit. The orthopedic consultant fitted him with appliances to prevent deformities until recovery was complete.

Diagnosis.—Among the diagnoses considered, the most probable were acute anterior poliomyelitis and acute infectious polyneuritis. The sudden appearance of flaccid paralysis involving the extremities was suggestive of poliomyelitis. However, the absence of fever, leukocytosis and constitutional symptoms, the absence of pleocytosis in the spinal fluid, the symmetry of the paralysis in contrast to the patchy asymmetry of the poliomyelitis, and finally its duration beyond the period where poliomyelitis usually halts, served to rule out poliomyelitis.

COMMENT

Acute infectious polyneuritis, also called acute infectious polyneuritis, was originally described by Sir William Osler¹

in 1892. However, it was not accepted as an entity until the World War, when successive reports appeared in the literature (Patrick,² Kennedy,³ Bradford, Bashford and Wilson⁴).

While the etiology is not known, the theory of a virus as the responsible cause finds considerable favor—a virus with a predilection for the peripheral neuron. Wilson⁴ and his co-workers isolated a virus and transmitted the disease to monkeys. In a large number of cases there was a history of a preceding infection. In the thirty-five cases reported by Gilpin, Moersch and Kernohan,⁵ 50 per cent had a preceding infection of the upper respiratory tract or influenza.

The essential pathologic change is a patchy degeneration of the myelin sheath of the peripheral nerve, with fragmentation of the axis cylinder and with no evidence of inflammation. The dorsal root ganglions may show lymphocytic invasion.⁵ Pathologic changes on rare occasions occur in the anterior horn cells and in the brain⁶ but the cord changes never resemble the lesions of anterior poliomyelitis.⁷ Cobb and Coggeshall⁸ summarily state that the axon seems to be more severely involved than the nerve cell, which obviously does not die and permits subsequent regeneration to take place.

During the clinical course, following recovery from a transitory infection, usually involving the upper respiratory tract, there is a latent period ranging from a few days to several months during which there are no premonitory symptoms. Then suddenly weakness and paresthesias of the extremities appear, the lower more often than the upper limbs being the site of involvement. There are no constitutional symptoms and no fever. Characteristically there is a rapid widespread involvement of all the extremities causing a flaccid paralysis of varying degree of severity. The facial nerve not infrequently becomes involved, unilaterally or bilaterally.² The deep reflexes are diminished or lost. Sensory symptoms are not marked, objective sensory changes are usually lacking and sphincteric control is usually not disturbed. Involvement of the cranial nerves other than the seventh is rare. No fibrillary twitchings are noted in the involved muscles. Atrophy, when it occurs, is the result of disuse.

McIntyre⁹ separated the cases into four groups; group I A, with rapid onset and rapid recovery; in these cases there frequently was seventh nerve paralysis; group II A, which ran a steady down hill course with early death; group III, with a long drawn out course and ultimate incomplete recovery; and group IV, which slowly progressed to ultimate death from bulbar involvement. In most of the cases satisfactory recovery takes place within six months or a year. In the cases reported by Bradford, Bashford and Wilson⁴ the mortality rate was 26.6 per cent.

The laboratory is of assistance in establishing the diagnosis. The spinal fluid is clear, not under increased pressure, shows no pleocytosis and characteristically shows an increase in the total protein. Madigan and Marietta⁶ observed the changes of the protein content of the spinal fluid in a case; the initial spinal fluid showed a total protein of 18.4 mg. per hundred cubic centimeters; it increased gradually to 122 mg., then gradually declined to normal (from 15 to 45 mg.). In all the cases reported by Gilpin, Moersch and Kernohan⁵ the total protein was elevated (from 100 to 1,800 mg. per hundred cubic centimeters) and the cells varied from 1 to 80, all lymphocytes.

SUMMARY

On the fourth day following the crisis of an uneventful case of bronchopneumonia, there suddenly appeared paralysis of the upper extremities. This was quickly followed by involvement of the lower extremities, with flaccid paralysis of all four

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6. Madigan, P. S., and Marietta, S. W.: Polyradiculoneuritis with Report of a Case, *Ann. Int. Med.* 12: 718 (Nov.) 1938.

7. Garvey, P. H., and Slavin, H. B.: Acute Infectious Polyneuritis; *Internat. Clin.* 4: 38 (Dec.) 1938.

8. Cobb, Stanley, and Coggeshall, H. C.: Neuritis, *J. A. M. A.* 103: 1608 (Nov. 24) 1934.

9. McIntyre, H. D.: Infective Neuritis, *Ohio State M. J.* 33: 875 (Aug.) 1937.

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THE RELATIONSHIP BETWEEN THE PATHOLOGIC
CHARACTER OF THE LESION AND THE
EFFECTIVENESS OF CHEMOTHERAPY

As experience with bacterial chemotherapy has accumulated during the past few years there has been a tendency on the part of most writers to think solely in terms of bacteriologic specificity in predicting or interpreting chemotherapeutic effects. Experimental results clearly show that different bacteria vary in their general susceptibility to the bacteriostatic effects of compounds of the sulfonamide group. However, in evaluating chemotherapeutic effects in animal infections and in man it is advisable to keep in mind that from a practical standpoint the pathologic characteristics of the lesion under treatment are also of great importance. Diffuse infections characterized by the rapid multiplication and dissemination of invasive bacteria in tissues of relatively normal architecture or in fluids closely resembling normal serum or lymph are likely to respond favorably to chemotherapy. This group includes, specifically, the early stages of cellulitis, lymphangitis, erysipelas and lobar pneumonia and probably also acute pyelonephritis and infections of the cerebrospinal fluid. Whether the causative organism is a hemolytic streptococcus, a staphylococcus or a pneumococcus makes some difference in the choice of a drug, perhaps, but these lesions are generally susceptible regardless of the bacterial species. Sulfapyridine, which is apparently a more polyvalent drug than sulfanilamide, will be effective in the great majority of infections of this pathologic type, and the bacteriologic aspects are of secondary importance.

Infections of serous and synovial membranes such as peritonitis, pleuritis and suppurative arthritis (at least in their early stages) constitute another broad group of lesions which are generally susceptible to sulfonamide therapy. Diffuse non-necrotizing peritonitis in animals and in man is likely to respond to treatment whether the organism is a hemolytic streptococcus,⁷ a pneumococcus,⁸ a colon bacillus² or even a Welch bacillus.⁹ Pleural effusions which commonly develop during lobar pneumonia rarely progress to the formation of empyema in patients who have been treated with chemotherapeutic substances. Flippin and our group at the University of Pennsylvania treated 160 patients with type I pneumonia during 1938 and 1939, and the incidence of empyema was only 1.9 per cent in contrast with the "prechemotherapeutic" incidence of 13 per cent reported by Reimann for this type.¹⁰ I have seen several cases in which clinical and laboratory evidence of acute suppurative arthritis developed during the course of a septic infection and in which the arthritis subsided under chemotherapy without the necessity for surgical drainage. Infections of serous and synovial cavities have certain definite pathologic features in common, the most important probably being the early mobilization of an abundant protective mononuclear cell reaction, which Gay¹¹ has shown is a highly effective mechanism in killing bacteria. This cellular response is given added time to become mobilized when a substance like sulfanil-

amide is present to hold down the multiplication and toxin production of the infecting organisms. Furthermore, the lining membrane has a good blood supply and is resistant to the necrotizing action of proteolytic enzymes liberated during inflammation by leukocytes and bacteria. It has been shown that one of the most important factors conditioning the magnitude of sulfanilamide action is the amount of products of tissue or bacterial proteolysis in the environment. The capacity of endothelial surfaces to resist proteolysis is therefore another probable reason for the effectiveness of sulfonamide therapy in these infections.

So far I have considered the pathologic types of infectious lesions which are generally susceptible to sulfonamide therapy. It will be noted that they are all early lesions in which treatment by surgical methods has been more often harmful than beneficial. There are, on the other hand, certain definite types of lesions which are quite resistant to chemical treatment. The most conspicuous in this group are the localized abscesses of soft tissue or bone. Bacteriologic specificity again has only a limited significance in the chemotherapy of localized necrotic lesions in soft tissue, bone, pleura or peritoneum. They all tend to be resistant, regardless of the type of organism present. Use of the appropriate drug may have some effect in preventing spread of the infection to adjacent tissues and may actually mask the clinical signs and symptoms of the abscess. Prolonged treatment for a month or two may sometimes allow sterilization of the abscess, but as a general rule such a course will be unpractical and inadvisable. Premature withdrawal of the drug is likely to be followed by reactivation of the infection.

Suppurative thrombophlebitis is another type of pathologic lesion which is comparatively resistant to chemotherapy. The causative organism may be *Streptococcus haemolyticus*, *Streptococcus viridans* or *Staphylococcus aureus*. Chemotherapy will cause blood cultures to become sterile in a case of septicemia or spinal fluid cultures to become sterile in a case of meningitis, but the existence or development of a suppurative thrombophlebitis will make reinfection probable and will in any event greatly prolong the period of recovery.⁶

The practical significance of the emphasis which has been placed here on the pathologic characteristics of surgical infections is that it indicates the place of surgery in the present day treatment of infections. At some time during the clinical course of almost any surgical infection there is likely to develop a pathologic lesion which will not be susceptible to chemotherapy. When this lesion is dealt with surgically, at the right time, the course of treatment can be shortened (which is highly advantageous in preventing toxic reactions) and the chances of final recovery may be considerably increased. The process requiring surgical attack may be an abscess at the primary site of infection or in a lymph node draining the area. It may be a focus in a long bone or in a mastoid. Furthermore, the surgeon who recognizes the limitations of chemotherapy will not be tempted to employ any drug as a substitute for surgery in a necrotizing process such as acute appendicitis. He will limit the application of chemotherapy in this condition to the postoperative treatment of peritoneal infection beyond the limits of the appendix.²

The limitations of sulfonamide therapy in terms of pathology are well illustrated in the staphylococcal infections. One may as readily account for the relative resistance of staphylococcal infections on the basis of

7. Lockwood, Coburn and Stokinger.⁶ Ladd, Botsford and Curnen.⁸ Ladd, W. E.; Botsford, T. W., and Curnen, E. C.: Primary Peritonitis in Infants and Children: A More Effective Treatment, *J. A. M. A.* **113**: 1455 (Oct. 14) 1939.

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10. Reimann, H. A.: *The Pneumonias*, Philadelphia, W. B. Saunders Company, 1938.

11. Gay, F. P.: *Agents of Diseases and Host Resistance*, Springfield, Ill., Charles C. Thomas, Publisher, 1935, p. 306.

their pathologic characteristics as on the basis of the comparative resistance to sulfonamide bacteriostasis which the staphylococcus possesses. The conspicuous features of staphylococcal infection are tissue necrosis, suppurative phlebitis and the early tendency to form suppurative metastatic lesions. As a general rule the recovery of patients with staphylococcal septicemia, even with treatment by a drug having a high experimental antistaphylococcal effect, will probably depend on whether the primary distributing focus can be detected and drained. It is doubtful whether the specificity of any new compound in the sulfonamide group will be sufficient to overcome the protective "antibacteriostatic" environment which the staphylococcus provides for itself in localized lesions.

Surgical treatment has not by any means been supplanted by sulfonamide therapy. On the surgeon still rests the responsibility for first detecting and then draining or removing the localized suppurative distributing foci which chemotherapy cannot successfully attack. The presence of one of the sulfonamide compounds in the tissue fluids of the potentially septic patient will help to protect him against the consequences of dissemination produced by whatever surgical procedure is necessary in eradicating the distributing focus. The masking of some of the diagnostic signs of infection by sulfonamide treatment appears to render the detection of obscure foci even more difficult than formerly, and new improvements in diagnostic technic may have to be developed. The sulfonamides are really effective principally against the invasive manifestations of infection which surgical treatment has in the past been more likely to aggravate than to cure.

In summary, it might be said that a lesion which is characterized by minimal loss of tissue architecture, and an exudate which is "serous," composed chiefly of lymph, bacteria and inflammatory cells, is likely to respond very rapidly to sulfonamide therapy. On the other hand, when the exudate is thick and purulent, having a high content of products of tissue proteolysis and many dead bacteria and phagocytes, the response to chemotherapy will be relatively slight except at the periphery, where bacteria are lodged in tissues which have not yet become broken down. Sulfanilamide will attack the invasive component of bacterial infections, but the localized abscess and the necrotic distributing focus are problems for surgical drainage or excision. In these areas the bacteria remain potentially invasive; if the inhibitory effect of the drug is removed and host resistance is still inadequate, reinvasion occurs.

GAS GANGRENE

Experimental results with sulfanilamide treatment of *Clostridium welchii* infections in small animals have not been encouraging. Long and Bliss⁹ and Stephenson¹² have shown that mice may be protected against lethal doses of the organisms administered intraperitoneally. However, the Welch bacillus produces its toxin in the presence of devitalized muscle tissue, and the invasive disease produced by intraperitoneal infection of mice is not at all comparable to the lesion of gas gangrene as it occurs clinically. When the bacteria are introduced intramuscularly, even after having been washed free from preformed toxin, the results have been uniformly negative. Erb¹³ in our laboratory could find no protection of pigeons with sulfanilamide given before and

after infection, in contrast to antitoxin, which was highly effective. Kendrick¹⁴ obtained similar results with guinea pigs, and Stephenson was unable to protect mice which had been infected intramuscularly. Bohlman's¹⁵ early report of recovery in three cases in which a clinical diagnosis of gas gangrene was made scarcely constitutes adequate proof of the specific value of the drug against *Clostridium*. For the present it would seem that our chief reliance should be on prevention of gas gangrene by débridement of susceptible wounds and administration of prophylactic antitoxin. It is possible that sulfanilamide treatment might have some value in limiting the activity of pyogenic cocci, which are known frequently to prepare the ground for gas gangrene. One would therefore be justified in using one of the sulfonamide preparations in conjunction with other measures, while recognizing the fact that the drug perhaps has little effect on *Clostridium* itself.

THE PROPHYLACTIC USE OF SULFANILAMIDE

If pathogenic bacteria are implanted in a fresh wound they will, after a few hours, start to multiply, utilizing the tissue fluids in the wound as a culture medium. If there are foreign bodies or devitalized tissues in the wound, the environment becomes rapidly favorable for bacterial growth and toxin production.

Prior to the introduction of the sulfonamides it was recognized that the most important consideration in preventing wound infections was to employ gentle handling of tissues in operative procedures and to carry out thorough débridement and cleansing of grossly contaminated accidental wounds before bacteria had had time to start to multiply actively. The prophylactic use of the sulfonamide compounds in prevention of wound infection is a supplementary means of holding down the multiplication of bacteria which gain access to an operative wound or cannot be removed by débridement from a traumatic wound. Sulfanilamide action is maximal when the number of bacteria is small, the amount of devitalized tissue slight and the concentration of the drug high. Under these conditions there may occur restriction of the outgrowth of types of bacteria which are usually quite resistant to the bacteriostatic effects of the drug. If an effective concentration of the drug can be added to the tissue fluids of the wound before multiplication has actually commenced, the normal tissue defenses will have an opportunity to become mobilized.

The principle of prophylactic treatment is now being applied by the British Royal Army Medical Corps in the management of war wounds.¹⁶ It was reported in an official study¹⁷ that 70 per cent of fatal infections during the last war were due to hemolytic streptococci. It may be that in the current war the incidence of such infections can be greatly reduced. At the Hospital of the University of Pennsylvania we have for three years been using sulfanilamide by mouth in the prophylactic treatment of severe compound fractures. Infection has probably been prevented in some of these cases. Prophylactic sulfanilamide is now being used also in industrial practice in an effort to reduce the amount and duration of disability from infection following injuries

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13. Erb, W. H. M., to be published.

in shops and factories.¹⁸ While the theoretical value of such treatment cannot be contested, there are some real dangers to be considered from its indiscriminate application in all types of trivial injuries. Apart from the fact that toxic effects appear to occur more frequently and with greater severity in ambulatory individuals, there is the added danger that the drug will produce motor incoordination and other effects in the central nervous system. No person should be allowed to operate a machine of any sort while taking sulfanilamide. Therefore it would seem advisable to restrict the prophylactic use of sulfanilamide to patients whose injuries are sufficiently disabling to demand their complete inactivity.

Jensen, Johnsrud and Nelson¹⁹ have carried out a clinical and experimental study of the effect of implanting crystalline sulfanilamide into freshly debrided compound fracture wounds. When from 5 to 10 Gm. of crystals is placed in the wound before closure the drug concentration in the wound remains above 200 mg. per hundred cubic centimeters for more than thirty hours. Such a concentration would be highly effective in inhibiting the growth of even resistant organisms such as *Staphylococcus aureus* or *Clostridium* during a critical stage of wound repair. There was no evidence that the drug interfered in any way with wound healing. In their series, thirty-nine drug treated compound fractures healed without infection, while infection occurred in 27 per cent of ninety-four fractures treated by similar methods but without sulfanilamide. A distinct hazard in this application of sulfanilamide, particularly if amounts as high as from 15 to 20 Gm. are used, is the possibility of severe toxic reactions in hypersensitive persons. While it is unlikely that this danger would be sufficiently great to contraindicate the method if it were the only possible means of controlling infections in compound fractures, it will be important to find out whether local implantation gives better results in practice than oral dosage. Clinical studies now in progress may justify the use of crystalline drug implanted locally in the prevention of infection in other types of surgical wounds, including large hernias, lobectomies and pneumonectomies, and contaminated intestinal resections. But for the present it seems to me that local implantation of the drug should be used only to supplement oral administration and not in place of it.

THE PRACTICAL APPLICATION OF SULFONAMIDE THERAPY IN SURGICAL INFECTIONS

This section is an attempt to set down, within the limits of a brief review, some notes on chemotherapy as applied to types of infections commonly encountered in general surgical practice. The suggestions put forward are altogether tentative and subject to modification with new developments in this rapidly changing field.

General Considerations. — 1. Choice of Drugs: Sulfanilamide appears still to be the drug of choice in hemolytic streptococcus infections and in nonspecific prophylaxis because:

(a) The incidence of serious toxic complications is relatively low and patients are not usually nauseated by it.

(b) By altering dose schedules it can be employed to provide high blood concentrations for a short period or low blood concentrations for a long period.

(c) It can be administered subcutaneously in 0.8 per cent solution in physiologic solution of sodium chloride when oral administration is inadvisable and can be implanted locally without irritation.

In pneumococcal infections sulfapyridine and sulfathiazole are more effective than sulfanilamide. Of these two the latter is perhaps preferable because it is less likely to produce nausea and vomiting.

In staphylococcal infections the value of sulfanilamide is quite limited, partly because of the pathologic characteristics of infections due to this organism. While sulfathiazole and sulfamethylthiazole appear to be more highly bacteriostatic for staphylococci than sulfanilamide, the relative clinical value of these drugs has not yet been determined.

2. Dosage and Methods of Administration: The daily dose is divided into six fractions when given by mouth and four fractions when given parenterally. The amount administered varies with the severity and relative susceptibility of the lesion under treatment. It is usually from 6 to 10 Gm. the first day, from 5 to 7 Gm. the second day and from 4 to 6 Gm. the succeeding three days. If a clinical response is obtained within forty-eight hours and the lesion is one in which relapse appears to be unlikely, the treatment is stopped on the fifth day. If the response to treatment is slow, but nevertheless apparent within two days, the treatment may be continued for from six to ten days. If the lesion is a chronic one and prolonged treatment of more than two weeks appears desirable, the daily dose is usually from 2 to 4 Gm. For treatment of this type it might be desirable to use a compound such as azosulfamide or benzylsulfanilamide,²⁰ which liberates free sulfanilamide more slowly.

On rare occasions one is confronted with a patient displaying some of the signs of invasive infection but in whom a definite diagnosis cannot be made. In such cases a "therapeutic test" with one of the sulfonamides may appear to be indicated. If no evidence of a therapeutic response is obtained within forty-eight hours it is probable that further continuation of the drug will be futile and perhaps undesirable. The same rule probably should be applied in the treatment of invasive infections due to bacteria whose susceptibility to chemotherapy has not yet been determined.

Sulfanilamide is usually given by mouth. Solutions for parenteral use are prepared by adding 8 Gm. of crystalline sulfanilamide to a liter of hot physiologic solution of sodium chloride, which is then allowed to cool.

NOTES ON CHEMOTHERAPY IN THE PREVENTION AND TREATMENT OF SPECIFIC LESIONS ENCOUNTERED IN GENERAL SURGICAL PRACTICE

Diffuse Cellulitis and Lymphangitis.—Prophylaxis: Administration of sulfanilamide by mouth for five days is probably of value in severely traumatized, contaminated wounds and compound fractures, but only in conjunction with, and not as a substitute for, thorough débridement and cleansing of the wound. Local implantation of sulfanilamide crystals in compound fracture wounds has been reported to be very effective.¹⁹

Treatment: Sulfanilamide in full doses should be used for the first forty-eight hours, followed by gradually diminishing doses until the seventh day. The management thereafter will depend on whether or not

18. Brylski, F. J.: *Prontylin and Neoprontosil: Their Use in Industry*, Indust. Med. 8: 469 (Nov.) 1939.

19. Jensen, N. K.; Johnsrud, L. W., and Nelson, M. C.: *Local Implantation of Sulfanilamide in Compound Fractures*, Surgery 6: 1 (July) 1939.

20. Lockwood, J. S., and Robinson, H. J.: *An Experimental Comparison of Sulfanilamide and Benzylsulfanilamide*, J. Pharmacol. & Exper. Therap. 68: 201 (Jan.) 1940.

localized abscess formation has occurred. Immobilization, elevation and heat should be used in conjunction with chemotherapy.

Acute Lymphadenitis.—Prophylaxis: Prophylactic treatment consists of the early treatment of cellulitis and lymphangitis.

Treatment: When suppuration is doubtful, sulfanilamide is given until fever and local signs of acute inflammation subside, usually for from seven to ten days. Complete resolution will not occur if pus is present. When suppuration is definite, sulfanilamide may be given for one or two days, after which the abscess should be incised and drained. Chemotherapy may then be continued for a few days, depending on whether there is any residual peripheral cellulitis.

Soft Tissue Abscess.—Prophylaxis: Early treatment of cellulitis may prevent abscess formation.

Treatment: Surgical drainage is indicated. Chemotherapy should be used only if cellulitis also is present.

Nonsuppurative Phlebitis.—Chemotherapy is of little value. Good results are being obtained from bandaging the affected extremity and from paravertebral sympathetic block.²¹

Suppurative Thrombophlebitis. — Prophylaxis: The avoidance of continuous venoclysis in septic patients is probably desirable.

Treatment: Chemotherapy is of limited value in attacking the local lesion but should be used in full doses in order to limit dissemination. Heparin may be of value in limiting propagation of the thrombus. Ligation of the vein proximal to the area of infection may be helpful in special cases.

Septicemia. — Prophylaxis: Chemotherapy and immobilization should be applied to early lesions likely to lead to septicemia. Surgical procedures should be avoided in diffuse cellulitis, but if unavoidable (as in acute tenosynovitis) the use of sulfanilamide before and after operation may help to minimize dissemination.

Treatment: Chemotherapy is indicated in full doses. If the drug is effective, marked clinical improvement is usually evident within forty-eight hours. The prognosis is much better if foci of distribution or localization can be drained. Frequent small (250 cc.) transfusions of fresh whole blood are probably helpful. Intravenous "double potency" bacteriophage²² is promising in staphylococcic septicemia, particularly in conjunction with chemotherapy.

Osteomyelitis.—Sulfonamide therapy may be directed against the dissemination of the infection but is probably of only limited value in the treatment of established bone foci. It should be used during and for a few days after surgical procedures likely to cause dissemination.

Pulmonary Abscess.—Chemotherapy is apparently of little or no value because the organisms are drug resistant and the lesions are characterized by extensive necrosis.

Infections of Serous or Synovial Cavities.—Chemotherapy is particularly successful in the prevention and treatment of infections of serous and synovial cavities. This is probably because of the highly developed local cellular defense, the resistance to necrosis of the lining membrane and the readiness with which adequate concentrations of the drug occur in the fluids.

Pleuritis and Empyema.—Prophylaxis: Chemotherapy might be of value if used before and after pneumonectomy or lobectomy. Chemotherapy of pneumonia tends to prevent empyema.

Treatment: Chemotherapy and drainage by aspiration may be used if the exudate is serous. Resolution without the necessity for open drainage is likely under these conditions. Rib resection and drainage will be required as soon as the exudate is frankly purulent. Sulfonamide therapy in small doses after operation may shorten the period of drainage.

Primary Peritonitis. — Chemotherapy should be started in full dosage after the diagnosis has been established by paracentesis or by exploratory laparotomy through an incision of minimal size.²³ Appendectomy should be avoided in these cases. The choice of drug will depend on the organism found. Other treatment directed against dehydration, distention, hypoproteinemia and electrolyte imbalance is of great importance.

*Peritonitis Secondary to Inflammation or Perforation of the Bowel.*²⁴—Prophylaxis: Sulfanilamide therapy has been recommended for one day before and for four days after intestinal resections.²⁴

Treatment: Sulfanilamide treatment appears to be of value in all cases of acute appendicitis which, at operation, show evidence of infection beyond the limits of the appendix itself. Appendectomy is essential. Chemotherapy may be instituted also in cases of peritonitis secondary to soiling of the peritoneum from other causes but only to supplement surgical and other therapeutic procedures of established value. In cases of peritonitis the drug is given parenterally until oral feedings are permissible.

Acute Suppurative Arthritis.—Chemotherapy should be started as soon as the diagnosis has been made, either on clinical grounds or by aspiration and study of the exudate. If drug therapy is started early in the disease the results are very good and surgical open drainage will probably not be necessary. (The treatment of rheumatic fever or rheumatoid arthritis with sulfonamide is contraindicated.²⁵ Treatment should be continued for about a week after all clinical signs of inflammation have subsided.

Meningitis. — Prophylaxis: Prophylactic treatment consists of sulfonamide treatment of otitis media, mastoiditis and invasive sinusitis, in combination with appropriate surgical measures. Chemotherapy alone will not insure against a late spread of infection to the meninges from a suppurative focus in bone or blood vessels but will sometimes mask the existence of such a focus.

Treatment: Chemotherapy should be instituted in full doses by mouth or parenterally. Some authorities recommend administration of the drug intrathecally as well.²⁶ The use of a drug having specific bacteriostatic effect on the causative organism may bring about marked clinical improvement and clearing of the spinal fluid, but relapse is very likely to occur unless the focus that feeds the spinal fluid can be drained or removed. Treatment should be continued in gradually diminishing doses for at least two weeks after apparent clinical

23. Lockwood, J. S., and Ravdin, I. S., to be published. Ravdin, Rhoads and Lockwood.²

24. Lockwood, J. S., and Rhoads, J. E.: The Use of Sulfanilamide in the Treatment of Peritonitis, *S. Clin. North America* 19: 1457 (Dec.) 1939.

25. Swift, H. F.; Moen, J. K., and Hirst, G. K.: The Action of Sulfanilamide in Rheumatic Fever, *J. A. M. A.* 110: 426 (Feb. 5) 1938.

26. Neal, Josephine B.: The Treatment of Acute Infections of the Central Nervous System with Sulfanilamide, *J. A. M. A.* 111: 1353 (Oct. 8) 1938.

21. Ochsner, Alton, and DeBakey, Michael: Thrombophlebitis: The Role of Vasospasm in the Production of the Clinical Manifestations, *J. A. M. A.* 114: 117 (Jan. 13) 1940.

22. Longacre, A. B.; Jern, H. Z., and Meleney, F. L.: The Treatment of Staphylococcic Septicemia with Bacteriophage, *Surg., Gynec. & Obst.* 70: 1 (Jan.) 1940.

recovery. Most of the cures in meningitis due to hemolytic streptococci, pneumococci and staphylococci are a result of skilful and timely surgery in conjunction with chemotherapy and are not by any means due to the drug alone.

CONCLUSIONS

1. The pathologic character of the infectious lesion is an important factor in determining the effectiveness of sulfonamide therapy.

2. Surgical treatment is required in eradicating localized suppurative foci which are resistant to chemotherapy.

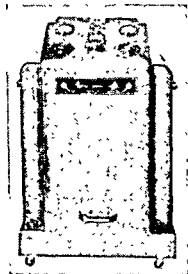
Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

CONTINENTAL SHORT WAVE UNIT MODEL SW-200 ACCEPTABLE

Distributor: Bedford Surgical Company, Inc., 1326 Fulton Street, Brooklyn.

The Continental Short Wave Unit, Model SW-200, is used for medical and surgical diathermy. Pads, cuffs, inductance coil, surgical accessories and metal electrodes are supplied as standard equipment. The shipping weight of the unit is 175 pounds.

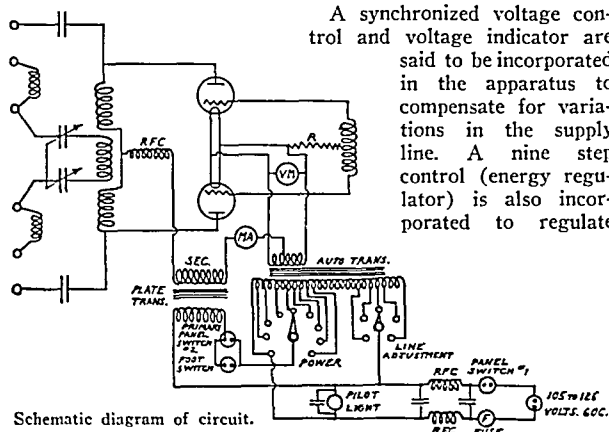


Continental Short Wave Unit, Model SW-200.

The firm states that the unit operates on approximately 12 meters and utilizes two tubes in a self-rectifying, push-pull tuned plate, tuned grid oscillating circuit. The tubes consist of two HF-120 oscillator tubes. The patient's circuit is inductively and capacitatively coupled to the oscillating circuit and is controlled by two variable condensers in series connected to both sides of the patient's outlets, coupled to a single control. In tests performed by the Council the power input was found to be 800 watts and the output 300 watts;

transformer temperature was 78.2 C. after the unit had been operated at full load for two hours. This temperature comes within the limits of safety prescribed by the Council.

A synchronized voltage control and voltage indicator are said to be incorporated in the apparatus to compensate for variations in the supply line. A nine step control (energy regulator) is also incorporated to regulate



energy to the patient's circuit. Three radio frequency chokes in the circuit are said to reduce radio interference.

Data concerning deep muscle temperature measurements was submitted by the firm and confirmed by the Council. The data are as follows:

DEEP MUSCLE TEMPERATURE MEASUREMENTS DOUBLE CUFFS

Technic: Double cuffs were placed 7 inches center to center, each equidistant from the thigh cannula. The cuffs were $2\frac{1}{4}$ by

19 inches, and three-fourths inch of felt was used for spacing. The current on the ammeter was 200 milliamperes plate circuit.

Average temperature of six tests: Deep muscle, initial 97.4, final 106.7. Oral, initial 98.4, final 98.6.

CABLE

Technic: Four turns of cable were placed 8 inches center to center equidistant from the thigh cannula with three-fourths inch felt and towel spacing. The plate reading was 200 milliamperes.

The average temperatures of six tests were: Deep muscle, initial 97.8 F., final 106.8 F. Oral, initial 98.3 F., final 98.6 F.

The Council report indicated that the Continental Short Wave Unit, Model SW-200, had been used almost daily on about fifteen different patients. It was found that the heat is just as effective as that of other short wave apparatus.

Clinical investigation of the unit by the Council revealed that spacers might well be used with the coil because of its marked flexibility and small diameter. The apparatus is easily adjusted and applied.

The Council voted to accept the Continental Short Wave Unit, Model SW-200 for inclusion on the Council's list of accepted devices.

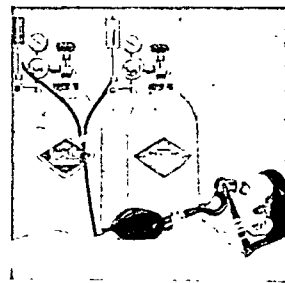
B-L-B INHALATION APPARATUS ACCEPTABLE

Manufacturer: The Ohio Chemical & Manufacturing Company, 1177-1199 Marquette Street N.E., Cleveland.

The B-L-B Inhalation Apparatus with Helium-Oxygen Equipment is named for its designers, Boothby, Lovelace and Bulbulian. According to the firm, the advantages of the apparatus are a low purchase and maintenance cost, the efficient use of therapeutic gases, the ability to give therapeutically the desired concentration of oxygen between that in air and pure oxygen, the ability to administer efficiently helium-oxygen mixtures, the mechanical simplicity and ease of operation, and the portability of the apparatus.

The equipment supplied by the firm consists mainly of three parts, the B-L-B Inhalation Apparatus, a reducing regulator and flowmeter for pure oxygen, and a reducing regulator and flowmeter for helium-oxygen mixtures.

The inhalation apparatus is composed of the mask proper and a metal connecting and regulating device which joins the mask to a rubber reservoir rebreathing bag. Two types of interchangeable masks are available. The nasal type leaves the mouth free for talking, eating or drinking, which is an advantage in prolonged use. The oro-nasal type covers the nose and mouth and is for use by persons who have nasal obstructions or who are mouth breathers. In both types provision is made so that a suction tube can be passed through when it is desired to administer 100 per cent oxygen in combination with the use of the Wangenstein or Miller-Abbott suction method of intestinal decompression. The masks are available in two sizes.



B-L-B Inhalation Apparatus.

By the adjustment of three small portholes in the connecting and regulating device, it is possible to regulate the proportion of atmospheric air admitted to the apparatus which, in conjunction with the appropriate flow of oxygen or helium-oxygen mixtures, gives the desired mixture of the inspired gases.

In use, the compressed oxygen or helium-oxygen mixtures first pass through a reducing valve and flowmeter; next they enter the inlet tube of the B-L-B apparatus and are delivered through a tube to the lower end of the reservoir rebreathing bag. Then they pass into the nose chamber, through the connecting and regulating device, and are inhaled by the wearer. The exhaled gases pass down through the tubes and the connecting and regulating device, where a part of the gases pass out through

any holes that may be open in the rotary sleeve. The remaining portion passes downward into the bag, where it is mixed with the incoming gases.

When the bag becomes distended with the mixture of expired air and incoming gas, the slight pressure then produced permits the excess to escape through the expiratory valve. The expired air thus escaping will be from the latter part of the expiration and will contain the most carbon dioxide and least oxygen. That part of the expired air which passes into the bag first and contains the least carbon dioxide and the most oxygen is available for rebreathing. On the next inhalation the mixed oxygen and expired gases, further admixed with atmospheric air entering through the portholes, are again drawn in.

The Council investigated and used the apparatus clinically and found no objectionable features referable to its construction or to the claims made. Actual gas analyses bore out the stated claims as to efficiency. In patients for whom its use was undesirable, the fault was with the apparatus rather than with the method.

The Council on Physical Therapy voted to accept the B-L-B Inhalation Apparatus with Helium-Oxygen Equipment for inclusion on its list of accepted devices.

Council on Pharmacy and Chemistry

PRELIMINARY REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING PRELIMINARY REPORT, CONSIDERATION OF COBRA VENOM BEING POSTPONED BY THE COUNCIL TO AWAIT FURTHER EVIDENCE CONCERNING ITS USEFULNESS AND HARMLESSNESS. THE COUNCIL HAS LIKEWISE POSTPONED CONSIDERATION OF THE BRAND SUBMITTED BY THE FIRM OF HYNSON, WESTCOTT & DUNNING UNDER THE NAME COBRA VENOM SOLUTION (SECRETION OF NAJA) AND DESIRES TO EXPRESS ITS APPRECIATION OF THE COOPERATIVE SPIRIT WITH WHICH THE FIRM AIDED THE COUNCIL'S CONSIDERATION. PAUL NICHOLAS LEECH, Secretary.

COBRA VENOM SOLUTION (SECRETION OF NAJA) (HYNSON, WESTCOTT & DUNNING)

Hynson, Westcott and Dunning, Inc., presented for the Council's consideration Cobra Venom Solution (Secretion of Naja). The preparation is proposed for intramuscular injection as a slowly but persistently acting analgesic which lacks the chief disadvantages of morphine. When this report was prepared it was marketed in ampules of 1 cc., each of which represents 5 mouse units. A mouse unit is that amount of cobra venom solution which causes the death of a mouse of average weight of 24 Gm. in twenty-four hours.

The use of venoms or extracts of venomous reptiles as analgesics began about ten years ago when Monaelesser of New York learned that a Cuban leper who had been bitten by a tarantula experienced amelioration of painful and nervous symptoms. In Paris he gave cobra venom to 112 cancer patients in a dilution of 1:80,000 and noticed lessening of pain after four or five doses. Slower development, and even regression, of the tumors was reported at the same time. Since then the use of cobra venom for the relief of pain has been the subject of many investigations.

Nearly all the venoms derived from serpents for therapeutic use contain hemolysin, hemorrhagin, proteolysin and neurotoxin in widely different concentrations and ratios in different species and even in specimens from the same serpent under varying conditions. Cobra venom contains far greater amounts of neurotoxin than that of either the rattlesnake or the moccasin and on this basis rests its use as an analgesic. Chemically it contains the elements carbon, hydrogen, sulfur, oxygen, nitrogen and phosphorus. The dried venom yields 87.56 per cent of protein with the following fractions: globulin 20.31 per cent, albumin 39.69 per cent, primary proteose 11.31 per cent and secondary proteose 16.81 per cent. Lecithin (partly free) and cholesterol may also be found. The toxicity of the venom is attributed to the secondary proteose. Three enzymes have been demonstrated, a proteolytic one which is capable of digesting gelatin, casein, fibrin and crystallized egg albumin; a rennetic

enzyme, and one which may split lecithin. The hemolytic power of cobra venom is associated with a fraction composed of globulin and primary proteose.

The effect of cobra venom in the mammalian vascular systems varies with the species. Intravenous injection of the venom into cats anesthetized with dial causes a steep fall in blood pressure, the action being said to be due to obstruction in the pulmonary circulation without contributory heart failure. Injection into the femoral artery causes vasoconstriction of the limb. With survival there is recovery of the blood pressure followed by a slow secondary fall due to loss of circulating fluid, with hemorrhagic edema of the lungs and, in some cases, from heart failure. The effects in cats are different from those in dogs, the fall in blood pressure in the latter being due to vasodilatation rather than pulmonary obstruction, and permeability of the capillaries with loss of fluid causes an increase in the concentration of the hemoglobin. The fall in blood pressure in the dog induced by the intravenous injection of cobra venom is due to a peripheral action similar to that of peptone. Respiration is accelerated slightly by small doses but is decreased with large doses by paralysis of the phrenic nerve. Injection into the veins or lymphatics induces an action similar to that of curare. It has been reported that cobra venom causes the blood sugar to be increased in guinea pigs but has little effect in this respect in the rabbit.

Tissue activity has also been shown to be influenced by cobra venom. Low concentrations of the venom stimulate tissue growth in vitro, whereas high concentrations exert an inhibitive action. These effects are attributed to different types of enzyme action on fibrin. Changes in surface tension opposite in direction to those in viscosity are induced by injection of the venom, probably because of increase in the protein concentration in the plasma. In monkeys it has been shown that the alterations in the reaction of the plasma and the buffering are parallel, the result of carbon dioxide tension caused by the action of the venom on the respiratory center. Venoms and the avensoms of the cobra and vipers retard or cause to regress the growth of the Rous sarcoma in fowls, but the action is not specific. A certain inhibitory action is seen in mammals but large doses of the venom have no effect much beyond the point of injection on rapidly growing carcinomas in rats.

Macht and his co-workers have shown that cobra venom (a) inhibits the growth of the roots of lupin seedlings, indicating them to be protoplasm poisons, (b) suffers a rapid loss in potency when exposed to ultraviolet radiation, (c) stimulates and later depresses the ability of a rat to find its way to food in a maze, (d) facilitates mathematical calculations in man, (e) increases acuity of vision and widens the field for certain colors without affecting the size of the pupil, (f) slightly increases acuity of hearing, (g) stimulates the respiration and circulation in the cat but fatal doses cause death by paralysis of respiration, (h) exerts its analgesic action in the higher centers of the brain or on some lower synapses but not on the periphery, (i) is fatal to the cat if 1.35 mg. per kilogram of body weight is given intravenously, and to the frog if 0.01 mg. per 20-22 Gm. of body weight is given intraperitoneally, (j) antagonizes the convulsant action of picrotoxin and certain other convulsants that act on the medulla, (k) improves neuromuscular coordination and work, (l) usually increases the experimental contraction of the index finger, and in long continued large doses does not appear to impair the functions of the liver or of the kidney of the rabbit.

Varying degrees of success have been reported in the use of cobra venom for the relief of pain in cancer. Many agree that relief of the pain is usually obtained, and in some cases apparent regression of the tumors have been observed. However, the latter effect is doubtful. The types of cancer cases experimented with included cancer of the prostate, bronchus, stomach, lungs, colon and breast. Other diseases causing pain which were reported to be successfully relieved by venom therapy include trigeminal neuralgia, leprosy of the nerve type, rheumatoid arthritis and other forms of arthritis. However, cobra venom seems to be of little value where pressure on a nerve exists. Improvement of appetite, whether a direct effect or due to decreased use of the morphine which had been necessary in so many cases, has been noted. The use of cobra venom in parkinsonian syndrome has been more recently reported.

No serious complications have been reported following therapeutic injection, although local reactions are not unknown. A few investigators have seen headache, nausea, diarrhea, fever and a pain at the site of injection following the use of Cobra venom. No observable changes have been found in the red blood corpuscles, blood pressure, temperature, pulse rate or blood picture, nor has there been found any pathologic condition such as hemorrhage or infiltration, or effects on respiration or the gastrointestinal tract. Pigmentation, however, has occasionally been noticed, lasting for some weeks.

Apparently there are no true contraindications to the use of cobra venom for the relief of pain, but especial care is necessary with patients who have psychic disturbances or severe diseases of the liver or kidneys. No exacerbation of symptoms in cardiac, hypertensive or diabetic patients has occurred, nor has there been found any abnormality in urinalysis.

The technic of dosage is not simple and the optimum dose must be determined separately for every patient. It does not act uniformly as to degree and time in cases presenting approximately similar involvement. The dose is independent of age, well-being and other factors.

The manufacturer of Cobra venom solution, Hynson, Westcott and Dunning, Inc., submitted several clinical papers with the presentation of its preparation, but the Council does not believe that they afford sufficient evidence of a satisfactory nature on which to base an opinion concerning the therapeutic value of the venom. The directions in the specimen package circulars state that the first dose, 0.5 cc., should be injected intramuscularly, and 1 cc. on each of several successive days until definite relief of pain is noted. It is clear, however, that no fixed dosage after the first is available. The greater number of European observers have been influenced by the procedure of Monaesler and Taguet, who began with doses of about 2½ mouse units and gradually increased this at intervals of two or three days between injections. Some have attained doses of 20 mouse units or more, others have not exceeded 10 mouse units. The frequency of repetition employed is extremely variable. One must determine the single dose, as well as the frequency of repetition, for each patient so far as possible. Without careful supervision it would seem that the venom may do far more harm than good in many cases.

Ten ampules of the Cobra venom solution in a small box were submitted. These have been kept in the box; hence the conditions have been uniform for these ampules, but they show wide differences in color, and on standing different amounts of precipitate are seen. The firm's attention was called to this lack of uniformity, and the Council was informed that the differences are due to the preservative used. While it may be the cause of the precipitate, it does not explain the variability in amount. The firm wrote that the process of preparation has now been improved, but new specimens have not yet been seen. The firm submitted a list of 155 references, but with the exception of those of Macht and his associates there are only three clinical studies made by Americans and published in the United States of which the Council knows and which are suitable for analysis.

Cobra venom is certainly capable of relieving pain under varying conditions and appears to be of distinct value in giving relief from pain in cancer. It often fails completely, and it seldom, if ever, replaces morphine completely for any considerable time. It often causes pain of widely different degrees, probably owing to differences in composition, but this does not necessarily apply to the venom of Hynson, Westcott and Dunning, Inc. Among the disadvantages of Cobra venom which have been observed by European clinicians and others are pain of injection (intense at times), nausea, vomiting and diarrhea. However, Taguet and others have reported the absence of shock or other general or allergic reactions, though the records of patients treated number hundreds.

In summary, the Council considers purified Cobra venom to be of some value for the relief of pain, especially that of inoperable cancer (its use in the early stages would tend to delay curative measures); it does not displace morphine completely in more than relatively few cases but it is of value in these few; it appears to be of limited value in the treatment of tic douloureux and the various conditions commonly grouped loosely under the names of "rheumatism" and "arthritis"; its therapeutic effects are variable and uncertain in all painful conditions;

the disagreeable side actions, including nausea, vomiting, diarrhea and pain of injection—even intense pain at times, mentioned in medical journals—must be brought to the attention of those who use Cobra venom; it must not be recommended for those who are severely ill except those suffering from inoperable malignant tumors or from incurable disease; the optimum dosage (after the first single dose) remains to be determined; the effects are not immediate but may take hours to appear.

In view of the lack of sufficient evidence to warrant inclusion in N. N. R. at this time, the Council postponed consideration of Cobra venom and of the submitted brand and authorized publication of the foregoing preliminary report.

In accordance with the Council's custom, the adopted report was sent to the firm before publication. As a result of some correspondence certain editorial changes were made. The firm also informed the Council of its intention to double the strength of the marketed product from 5 mouse units to 10 mouse units per cubic centimeter without change in price.

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

SOLUTION OF POSTERIOR PITUITARY (See New and Nonofficial Remedies, 1940, p. 386).

PITUITARY SOLUTION-U. S. P. (U. S. S. P. Co.).—A brand of solution of posterior pituitary-U. S. P.

Manufactured by U. S. Standard Products Co., Woodworth, Wis.

Ampul Pituitary Solution-U. S. P., 1 cc. (U. S. S. P. Co.).

Ampul Pituitary Solution-U. S. P., ½ cc. (U. S. S. P. Co.).

Vials Pituitary Solution-U. S. P., 10 cc. (U. S. S. P. Co.).

Vials Pituitary Solution-U. S. P., 30 cc. (U. S. S. P. Co.).

SULFANILAMIDE (See New and Nonofficial Remedies, 1940, p. 489).

The following dosage forms have been accepted:

Tablets Sulfanilamide, 5 grains-Wyeth.

Prepared by John Wyeth & Brother, Inc., Philadelphia. No U. S. patent or trademark.

Tablets Sulfanilamide, 7½ grains-Wyeth.

Prepared by John Wyeth & Brother, Inc., Philadelphia. No U. S. patent or trademark.

Tablets Sulfanilamide, 10 grains-Wyeth.

Prepared by John Wyeth & Brother, Inc., Philadelphia. No U. S. patent or trademark.

BISMO-CYMOL (See New and Nonofficial Remedies, 1940, p. 147).

The following dosage forms have been accepted:

Bismo-Cymol, 60 cc. Bottle: Each cubic centimeter contains bismo-cymol equivalent to 50 mg. of metallic bismuth, dissolved in olive oil.

Bismo-Cymol, 500 cc. Bottle: Each cubic centimeter contains bismo-cymol equivalent to 50 mg. of metallic bismuth, dissolved in olive oil.

PHENOBARBITAL (See New and Nonofficial Remedies, 1940, p. 134).

The following dosage form has been accepted:

Phenobarbital Tablets, 0.1 Gm. (1½ grains).

Prepared by The Smith-Dorsey Company, Lincoln, Neb.

SULFAPYRIDINE (See New and Nonofficial Remedies, 1940, p. 494).

The following dosage form has been accepted:

Capsules Sulfapyridine, 0.25 Gm. (3¾ grains).

Prepared by Parke, Davis & Company, Detroit. No U. S. patent or trademark.

SOLUTION LIVER EXTRACT CONCENTRATED-LILLY.—Now Solution Liver Extract-Lilly, 2 U. S. P. Units Per CC. (See New and Nonofficial Remedies, 1940, p. 329).

Ampoules Solution Liver Extract-Lilly, 2 U. S. P. Units Per CC., 3.5 CC.: Marketed in packages of four 3.5 cc. rubber stoppered ampoules.

SOLUTION LIVER EXTRACT PURIFIED-LILLY.—Now Solution Liver Extract-Lilly, 15 U. S. P. Units Per CC. (See New and Nonofficial Remedies, 1940, p. 330).

Ampoules Solution Liver Extract-Lilly, 15 U. S. P. Units Per CC., 10 CC.: Marketed in 10 cc. rubber stoppered ampoules.

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SATURDAY, OCTOBER 5, 1940

PHYSICIANS NEEDED FOR INDUCTION BOARDS

After registrants are accepted by local draft boards they will be sent for physical examination to medical induction boards. About one hundred such boards will be set up throughout the country, about half of them near army posts and stations. Each board will consist of three internists, one general surgeon, one orthopedic surgeon, two ophthalmologists, one otorhinolaryngologist, one neuropsychiatrist, one clinical pathologist and one dentist.

As explained by Colonel Love (pages 1201-1202 of this issue), the specialists to be assigned to such service will probably include civilian specialists as well as reserve officers, who will be on temporary duty. Civilian physicians will be on a per diem basis and will be used as long as their services are required. It has been proposed that they be paid at the base pay of major with allowances for travel and subsistence while on duty. Physicians preferred for this service are those who, on account either of age or of physical infirmities or because of reasons affecting their civil life, cannot go into military camp. It has been tentatively estimated that the time required for this service might approximate twenty to thirty days in the period between October 16 and February 1.

In order to aid the Army Medical Department in securing physicians for this service, the Committee on Medical Preparedness requests physicians who wish to volunteer to write at once to the Committee on Medical Preparedness, 535 North Dearborn Street, Chicago, marking the envelop "Induction Boards."

VITAMINS FOR WAR

England, locked in the struggle of total war and conscious of the importance of maintaining at high levels the strength and courage of its people, has fortified margarine with vitamin A and restored calcium and thiamin hydrochloride (vitamin B₁) to flour.¹ This action was taken on advice from the Medical Research Council and with the recommendation of leaders in nutritional research. Sir John Orr² and Dr. J. C. Drummond³ were largely responsible. In consequence, ill effects from deficiency of calcium com-

pounds and vitamin B₁ will be minimized in England notwithstanding lower rations. Vitamin A will accompany whatever edible fats remain available, and calcium and vitamin B₁ will be supplied as long as any cereal food is left.

The slim margin that exists between man's physiologic requirements for vitamin B₁ and his intake of this vitamin has long been known; also the fact that storage of this vitamin is minimal and that debility quickly follows when men are deprived of it. The diets of half the population of England were found⁴ to provide a level of intake of vitamin B₁ less than that which the League of Nations Technical Commission regarded as necessary for adult men in peace time. That level was 300 international units a day. For soldiers, however, for men in factories and on the farms, in war time, for long work and short sleep, a level of 300 international units is certainly not optimal.

The Stiebling report from the United States Department of Agriculture⁴ revealed a large proportion of "poor" diets in peaceful America with its bursting granaries and troublesome problems of overproduction. The diets were poor in vitamins A, D and B₁ and in calcium. To some extent they were poor for lack of purchasing power, but to a large extent they were poor because of lack of skill in getting good food values for food expenditures. When white flour and sugar provide 50 per cent of the calories, as is the case in England and America, selection of a diet that can be called good, in the sense that it satisfies more than minimal requirements for vitamin B₁ and calcium, is almost impossible except for an expert.

Recent reports on induced vitamin B₁ deficiency⁵ bear directly on the importance of a liberal allowance of vitamin B₁ for a people engaged in war. Restriction of the intake of this vitamin in a group of healthy subjects, otherwise adequately fed, provoked, among other signs and symptoms, moodiness, sluggishness, indifference, fear, and mental and physical fatigue. The states of mind and body observed in these subjects were such as would be least desirable in a population facing invasion, when maintenance of stamina, determination and hope may mean defeat or successful resistance.

Other subjects in the experiment mentioned received thiamin hydrochloride in such an amount that their intake of thiamin would be almost, if not quite, up to the standard set for this vitamin by the League of Nations Technical Commission. These subjects remained in apparent good health for weeks, but when, at the end, more of this vitamin was administered—enough to raise the intake to 600 international units a day—alertness increased and measured capacity for physical work was almost doubled.

4. Stiebling, Hazel K., and Phipard, Esther F.: Diets of Families of Employed Wage Earners and Clerical Workers in Cities, U. S. Dept. Agr. circ. 507, 1939. Stiebling, Hazel K.: Dietary Levels in the United States, J. Nutrition 19 (supp.): 21 (June) 1940.

1. Moran, T., and Drummond, J. C.: Reinforced White Flour, Nature 146: 117 (July 27) 1940.

2. Orr, Sir John: Food, Health and Income: Report on a Survey of Adequacy of Diet in Relation to Income, London, Macmillan & Co., 1936 (summary in Lancet 1: 679 [March 21] 1936).

3. Drummond, J. C.: Margarine, Nature 145: 53 (July 13) 1940.

5. Williams, R. D.; Mason, H. L., and Smith, B. F.: Induced Vitamin B₁ Deficiency in Human Subjects, Proc. Staff Meet., Mayo Clin. 14: 787 (Dec.) 1939. Williams, R. D.; Mason, H. L.; Wilder, R. M., and Smith, B. F.: Observations on Induced Thiamine (Vitamin B₁) Deficiency in Man, Arch. Int. Med., to be published.

This suggests that efficiency for prosecution of a war can be increased by the simple expedient of providing a very little more of vitamin B₁ than the public is receiving. This subject is also receiving consideration by those responsible for our national defense.

USE AND ABUSE OF ADVERTISING BROCHURES

One of our colleagues who apparently has plenty of space at home decided about a year ago to save every piece of advertising literature in the field of therapy that came to him during 1939. A large closet was set aside for the purpose; the latest report indicates that material thus collected weighed over three hundred pounds. Even at the current price paid for waste paper, the collection will not pay for the cost of storage. The fact gives opportunity, however, for some philosophic considerations on the use and abuse of brochures circulated by manufacturers of proprietary products as their contribution to the education of the physician.

As examples of the printing art, many advertising brochures are good. As sources of scientific information in certain fields, some may be valuable. Some of the lithographs and four-color reproductions which illustrate anatomic appearances, physiologic functions and therapeutic technics are superior to anything that can be found in the available textbooks. Yet by no stretch of the imagination can any of these brochures be considered wholly scientific, since their purpose is obviously to sell specific products. Manufacturers are naturally averse to discussing in their brochures competitive products of the same type or alternative technics. They tell a story but seldom or never the whole story.

The manufacturer who reaches the general practitioner first and who accustoms him to the use of certain materials endeavors to retain his patronage for a considerable time. Hence the introduction of such substances as insulin and liver extract, which demand technical knowledge for determination of dosage and method of administration, is associated with the wide distribution by the manufacturers of extensive brochures discussing these matters. The introduction of new serums for use in pneumonia, and of sulfapyridine, has elicited a series of brochures dealing with these products. The newer anesthetics gave rise to theses dealing with the nature and composition of the products, as well as heavily illustrated brochures dealing with the technic of use.

As part of its function, the Council on Pharmacy and Chemistry of the American Medical Association has been accustomed to examine such brochures to make certain that the claims made are in accord with the acceptance of the product by the Council; thus the Council actually gives added prestige to brochures on products which are accepted. The difficulties involved in the examination of such a vast amount of material should be obvious. Indeed, some members of the

Council look askance on brochures that seem overelaborate as to production and illustration. It requires great time and effort to evaluate such monographs and to check and verify alleged scientific statements which seem to be more interested in selling than in science.

The whole field of medical publication is undergoing an obvious transformation. The speed of the times would seem to demand more in the nature of monographic publications dealing with a single subject and less of extensive textbooks which tend to become obsolete, at least in portions of their text, in a short time. Development of this trend for the monograph in the field of unbiased scientific literary production would be useful to the medical profession; it might lead to less abuse in the publication and distribution of brochures by commercial interests.

ACETYSALICYLIC ACID DEATHS

The only country in the world that permitted a patent for acetylsalicylic acid (aspirin) was the United States. The "Bayer" patent expired in 1917; since then the supply of acetylsalicylic acid or aspirin on the American market has been essentially of the same quality, irrespective of the manufacturer. Even after the expiration of the patent in 1917 it has paid the Bayer Company to continue the proprietary advantages gained thereby, and the concern has extolled, through advertisements and the radio, the virtues of acetylsalicylic acid for the self treatment of many disorders. Other firms have done the same. Probably no other drug, as widely used, has had fewer deaths reported following its use. Fortunately, most persons who take acetylsalicylic acid, in common with other salicyl compounds, experience a warning sign (tinnitus) if overdosage is imminent, so that the drug may be discontinued before these persons become seriously poisoned. In spite of the tremendous amount of self medication with aspirin in this country, comparatively little poisoning has been reported. No doubt, much harm indirectly has probably followed its indiscriminate use, in that conditions for which it was used were not remedied.

Since introduction of aspirin forty-one years ago by Dreser, many reports have appeared on the adverse effects which may follow its unwise use. These have included depression of the heart, habit formation, miscarriage in pregnancy, and idiosyncrasy causing such alarming symptoms as urticaria, pruritus, erythema and generalized angioneurotic edema. Cutaneous eruptions of various forms are not unknown, and even ulceration and gangrene have been attributed to its use. Because of the irritant action of the products containing the salicyl group on renal epithelium, acetylsalicylic acid is contraindicated in nephritis. Other persons especially susceptible to undesirable effects of the drug are drunkards and persons with diabetes. In the latter groups, adverse effects show a special relation to the nervous system.

Now comes a report¹ from the London *Lancet* indicating that a surprising number of deaths reported in England are due to this product, much out of proportion to the experience in the United States. According to this source, in England and Wales in 1938 the number of deaths due to poison was reported to be 735, of which 591 were suicides, ninety-two accidental and the remaining doubtful. The agent responsible for forty-three of the suicides, for eight of the accidental and for fourteen of the doubtful group of deaths was said to be aspirin; thus aspirin was reported as the cause of death in sixty-five of 735 fatal poisonings. In 1937 about the same number of deaths from poison occurred in this area, with aspirin listed as the responsible agent in sixty-one cases. In 1936 the number recorded was about half of the number in 1938, which would indicate that aspirin caused about 150 deaths in three years in England and Wales alone. The *Lancet* considers it "curious" that a drug which caused sixty-five reported deaths in one year is not classified as a poison. An antidote is not known for the treatment of cases of acute poisoning. Therapeutic agents which may be harmful in excess dosage have recently been subjected in Great Britain and in some areas in this country to certain restrictions to prevent excess sale to the public. Perhaps further attention should be given to acetylsalicylic acid (aspirin) if it is capable of causing as many deaths as have been reported in Great Britain.

Another member of the salicylic acid family which does not have altogether the same side reactions is methyl salicylate, well known commercially as oil of wintergreen. Approximately two years ago THE JOURNAL published an article on methyl salicylate poisoning in which Baxter, Hartwell and Reck² reported two deaths in children following the accidental swallowing of oil of wintergreen. The authors also referred to an article in the *Archives of Pediatrics* wherein twenty-eight cases of methyl salicylate poisoning were reviewed by Lawson and Kaiser,³ who added another case of death following the use of methyl salicylate as a counter-irritant. In the twenty-eight cases reported by Lawson and Kaiser there were ten recoveries and eighteen deaths. It is also interesting to note that, in the report of the Registrar General in Great Britain on Poisoning, methyl salicylate was shown to be responsible for three deaths in 1938, four in 1937 and four in 1936. Because of two recent deaths of children in Canada the Canadian Council of Health⁴ is considering classifying methyl salicylate as a poison. The mortality among the children has been as high as 60 per cent, even though only a small quantity has been taken. Evidently much more attention should be given to the toxicity of these rather common products which are used both in the home and in the practice of medicine.

Current Comment

MILITARY PREPAREDNESS

Elsewhere in this issue under the heading of Military Preparedness appear the minutes of the special session of the Committee on Medical Preparedness of the American Medical Association which called in Chicago a conference of all the chairmen representing the different state organizations for military preparedness. There appear also the minutes of the meeting of the committee itself, held the same day. In attendance also were representatives of the United States Army and Navy Medical Corps, the United States Public Health Service and the Selective Service organization. The information supplied was of the utmost importance in developing plans for the organization of the medical profession in relationship to mobilization of men for military service. Every physician should read carefully these minutes in order that he may be aware of the answers to many of the questions which are now pouring into the headquarters office. Every physician is anxious to do his part. Every physician is likely to be asked also as to exemption of various groups of the population, physical examinations and similar subjects. Most of the answers will be found in the material published in this issue. If not, at least there will be an indication as to the proper agency to be consulted for a proper answer.

THE EFFECT OF INDUSTRIALIZATION ON MORTALITY FROM TUBERCULOSIS

In a series of studies of mortality from tuberculosis and industrialization with special reference to the United States, Wolff¹ has presented statistical data obtained from many sources. The disease continues to retain its important place as a cause of death in spite of a remarkable decline. This is due, Wolff believes, to two causes: first, the prevalence of tuberculosis in persons in the prime of life; second, the fact that, as a chronic infectious disease, tuberculosis becomes active at any time when environmental conditions become unfavorable for large groups of people. Such was the experience of the World War in all those countries directly or indirectly implicated in war distress. Surprisingly, however, increasing industrialization has been accompanied by a decline in mortality from tuberculosis, probably because of the general improvement in standards of living for the bulk of the people brought about by industrialization. Density of population itself furthermore does not determine the mortality from tuberculosis but there is some other causal factor probably connected with crowding and social environment. It is therefore rational, Wolff believes, to aim preventive measures largely at improving social environment. For the time being at least the level of mortality from tuberculosis may be considered an index of hygienic and social culture. By this standard the United States ranks first among the world states even when the high mortality of the Negroes is included.

1. Wolff, Georg: Tuberculosis Mortality and Industrialization, *Am. Rev. Tuberc.* 42:1 (July, Aug.) 1940.

1. Aspirin as a Poison, *Lancet* 1:1091 (June 15) 1940.
2. Baxter, E. H.; Hartwell, R. M., and Reck, L. E.: Methyl Salicylate Poisoning, *J. A. M. A.* 111:2476 (Dec. 31) 1938.

3. Lawson, R. B., and Kaiser, A. D.: *Arch. Pediat.* 54:509 (Sept.) 1937.

4. *Pharm. J.* 145:5 (July 6) 1940.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

CONFERENCE ON MEDICAL PREPAREDNESS

Held at American Medical Association Headquarters,
Sept. 20, 1940

Because of the illness of Dr. Irvin Abell, chairman of the Committee on Medical Preparedness, Dr. James E. Paullin was elected to preside. A telegram from Dr. Abell said: "Am distressed in not being able to be present today at what I regard as an extremely important meeting. Since the A. M. A. has voluntarily assumed the responsibility for surveying the qualifications and availability of the medical personnel of the country, nothing should be allowed to interfere with the successful and prompt fulfillment of this self-imposed obligation. In the degree in which we succeed we shall be judged, and our responsibility to the American Medical Association demands 100 per cent fulfillment. Such states as are in arrears should be made to realize their duty and, if necessary, change in committee personnel made to give some assurance of discharge and fulfillment of duties assigned. With assurance of my hearty cooperation in all that you do, Sincerely, Irvin Abell."

The Coordinating Committee

Dr. Olin West, Secretary of the American Medical Association, reported the text of the executive order by the President creating the Coordinating Committee as described in THE JOURNAL last week.

The Medical Examining Function under Selective Service

Col. Charles B. Spruit gave the available information describing the work of the physicians under the Selective Service Act. This paper was published in full in THE JOURNAL last week.

Dr. Samuel J. Kopetzky, New York, stated that the medical profession had been completely organized for service in the selection of young men for training under the Selective Service Act. The governor of the state had conferred with him as chairman of the Preparedness Committee of the American Medical Association in New York. The state had been divided into eight police districts with main headquarters in Albany and separate headquarters in New York City, the mayor of New York City being in charge of these activities and the rest of the activities of the state under the direction of the Adjutant General in Albany. Two nominees were selected for each draft board of the state, and the governor selected a physician for each 30,000 of the population in the state to serve on the local draft board. Similar arrangements were made for the city after conference with the five county medical societies in Greater New York. Arrangements were also made to set up medical advisory boards to pass on appeals from decisions of the physicians of the local draft boards. Each medical advisory board contains a surgeon, an internist, an ophthalmologist, an otolaryngologist, a psychiatrist, an orthopedist, a roentgenologist and a dentist. The mayor and the governor of New York also requested lists of physicians with a broad, communal point of view to serve with draft boards as members of the board rather than as physicians. Contact was made with the state dental association and with the state pharmaceutical association, so as to provide the necessary members of the boards from these professions.

Function of Induction Boards

Col. Albert G. Love, United States Army Medical Corps, said that registrants under the Selective Service would first be passed on by the members of the board before they were referred to the physician. In 1917 one man out of every five or six exam-

ined was unable to go because of some economic or matrimonial reason. Thus a tremendous amount of unnecessary work was placed on the shoulders of the doctors. It is proposed on this occasion to have the man passed for all other reasons before submitting to the medical examination. A different plan would involve the examination of 16,500,000 men instead of the examination of 4,000,000. Every effort is being made to examine the man as closely as possible to his home so that he will be away from his home and job or position as short a time as possible. There will be 100 induction boards to make final examinations of registrants before they are sent to cantonments and camps. Selection and organization of these boards will be determined by the corps area commander. There will be one or more of these boards for every state, depending on the population. On each of these boards there will be one orthopedist, one general surgeon, three internists, two ophthalmologists, one otolaryngologist, one neuropsychiatrist, one clinical pathologist and one dentist.

The United States Public Health Service has taken over the work of collecting and making serologic examinations. X-ray examinations of the chest will not be made at these examining points for all men but will be made only as required in order to determine definitely whether a man is physically fit. Only such laboratory work will be done as the examination of sputum and urine. If more technical laboratory work is required, it will be delegated to local medical facilities. After the man is inducted and brought into camp a general x-ray examination of the chest of each man will be made, with the preparation of two permanent films. A hundred x-ray machines for the taking of such films have been ordered and will be delivered within the next six months.

Colonel Love stated that there are approximately 15,000 reserve officers now in the Medical Reserve Corps. The Army will require 8,000 physicians in addition to those now in the Army Medical Corps and those in the National Guard. If the 8,000 are taken from the Reserve Corps, it will be necessary to rebuild the Reserve Corps. In the setting up of the induction boards it is proposed to use civilian specialists as well as reserve officers. The Committee on Medical Preparedness will be associated with the development of the necessary personnel.

Medical Officers for the Navy

Capt. D. G. Sutton, United States Navy Medical Corps, pointed out that the Navy was not involved in any way with the problem of Selective Service at this time. Should the Navy become involved, the physical standards will be about the same as those set forth by the Army. All naval recruits are centralized in areas known as Naval Training Stations, of which there are eight or ten throughout the United States. The maximum number of men required by the Navy is about 500,000. He asked particularly that interest be stimulated in the Naval Reserve Corps as far as physicians are concerned. There are now approximately 1,100 vacancies in the various categories in the Naval Reserve Corps, that is of commissioned medical officers, and about 208 vacancies in the regular service. The Navy prefers the younger men who are recent graduates from class A medical schools.

Instead of planning for the large x-ray film of the chest, the Navy is using the small 25 mm. film.

DISCUSSION

The subject of the selection of physicians for the induction boards was discussed by Drs. Holman Taylor, Texas; W. C. Dixon, Tennessee; Stanley H. Osborn, Connecticut; F. X. McGovern, District of Columbia; John F. Sharp, Utah, and W. R. Brooksher, Arkansas.

Status of Physicians on Draft Boards

In reply to questions raised in this discussion, Colonel Spruit said that a member of the Selective Service Board will be a government official of the Selective Service. Physicians on the boards will not be paid. Colonel Spruit quoted the policy of Selective Service:

"There is a strong feeling in Congress and throughout the nation that, inasmuch as men are being called to military service at great personal sacrifice, Selective Service officials should be men willing to make an important sacrifice by contributing voluntary service, and that a process based on the devotion to the national interest should not deteriorate into a job-holding organization.

"It appears very probable, therefore, that no compensation will be provided for members of local boards, boards of appeal, medical advisory boards, examining physicians, additional examining physicians or other similar officials. Clerical employees will unquestionably be paid and will be thoroughly competent in order to free officials from petty clerical routine and leave them free to devote their time to their important responsibilities."

Provisions have been made to furnish supplies utilized and required in physicians' examinations in the Selective Service process and to pay for those procedures necessary for the determination of physical fitness, such as laboratory or x-ray examinations. Colonel Spruit requested the Committee on Medical Preparedness to establish a fair list of prices for technical examinations, which will be paid for from government funds after the due amount of paper work has been accomplished.

Colonel Spruit indicated that the fall quota for the Selective Service would be about 400,000 men, divided equally between 6,500 local examining boards, which would require about sixty men to be selected by each board. Applying the percentage of rejections, about ninety men would come before the physicians of the local board for physical examination. Since, however, the examinations are to be spread over a period of from three to four months, the total requirement of examination for each local board would be between twenty and thirty men a month.

The policy has been adopted that only doctors of medicine will be utilized in carrying out the medical functions of the Selective Service.

No plans have been made for taking men with correctable defects into the Army. Colonel Spruit said it would be a broad and desirable humanitarian procedure if the Army were able to take in the defectives of the nation secured by the draft and fix them up so that they could go back into civil life as good sound men. However, the purpose of the act is to get men to do twelve months of training and service, after which time these men go into the reserve for a period of years. The Army wants men who are immediately capable of undertaking full military service and not those who are inducted and then sent to hospitals for treatment before they can begin training. Men with correctable defects may be deferred by the local board, subject to a voluntary correction of the defects if the young man cares to have such correction made.

It is contemplated that the physicians who are members of induction boards may be compelled to travel in carrying out their services.

The Reserve Corps

Colonel Love, United States Army Medical Corps, pointed out that the Adjutant General, at the request of the Surgeon General, has sent out to every corps area commander who works through the corps area surgeon a request to send to every reserve officer a questionnaire in which he is asked whether he desires to accept military service at this time. If he cannot accept military service at this time, he is asked to put down the reason for his refusal. The army requires definite information as to the men who may be available for military service with the least possible disruption of the civilian medical services as far as teaching and hospitals are concerned. Doctors are required for 1,400,000 men who will be in training. When physicians are called under the Selective Service Act, they will have special status. Any man who is eligible for Selective Service may apply now for a commission in the Medical Officers' Reserve Corps. If he does not apply for a

commission and later is selected for service and taken into the Army, he will then be given an opportunity to qualify for a commission. He will, however, avoid registration under the Selective Service Act if he applies at once for a commission in the reserve corps.

The subject of examinations of interns, residents and medical students was further discussed by Dr. F. L. Smith, Minnesota; Dr. James E. Paullin, Georgia, and Dr. Harvey B. Stone, Maryland. Instructions have been sent, said Colonel Love, to the effect that an intern who has not completed one year of service is not to be considered eligible for active duty. Moreover, second year interns have been placed on a low priority list and are not to be disturbed if this can possibly be avoided.

Physicians on Induction Boards

In reply to a question, Colonel Love stated that physicians who are serving on induction boards, with the exception of the officer in charge of the board, will be on temporary duty. Reserve officers who are available will be called under a temporary duty status. Civilian physicians will be on a per diem basis and will be used as long as their services are required. Civilian physicians will be without military status. It is planned to utilize the services of those who, on account either of age or of physical deformities or because of reasons affecting their civil life, cannot go to military camp but are willing to engage in this type of service and thus do their part in the field of national defense.

The work of the physicians on the Selective Service Board, as developed in Indiana, was described by Dr. Charles R. Bird.

Arrangements were made to send to the headquarters of the American Medical Association complete lists of the names of all physicians serving on Selective Service local boards and advisory boards. Dr. Olin West pointed out also the need for supplying the headquarters office a complete list of all medical reserve officers in each state. Further discussion was supplied by Dr. Hugh H. Trout, Virginia, who requested information as to the manner in which the list of questionnaires was to be made complete. Dr. Arthur T. McCormack, Kentucky, described the activities carried on in that state, which now has the record of having secured the greatest number of returns. Dr. Holman Taylor, Texas, discussed the recording and status of physicians associated with the National Guard.

Exemptions of Medical Students, Interns and Residents

Dr. Olin West pointed out that many letters had been received in the headquarters office from interns, residents and medical students, as well as from faculties of medical schools, inquiring as to the status of these groups under the Selective Service law. Dr. Morris Fishbein asked as to the status of interns under the Selective Service and as to whether or not they would be given an opportunity to qualify for a commission in the Medical Reserve Corps. It was pointed out that the Selective Service Act exempts young men in universities in training for degrees in science and that many medical schools do not award a diploma until after the internship is completed. It was pointed out also that the certifying boards for the various specialties would have to arrange in some manner to provide for the resident who had completed one or two years of his residency or fellowship and who was called to military service. In response Colonel Spruit said:

"I shall have to descend to the status of a guardhouse lawyer, since this is now a matter of the interpretation of the law. Let me read you a brief description of what the law says. Now the law uses two terms: one of them is the word 'exemption,' which means to clear out; the other is the word 'deferment,' which means to put off. And so with those two barnyard definitions we will proceed.

"The first exemption that is open or that will be conferred upon members of the medical profession is an exemption from registration. Obviously, if you don't get your name on the book, they can't find you. So if you are not registered, if you are exempt from registration, you will not be called. And the exemptions from registration comprise the warrant officers and enlisted men of the Regular Army, Navy, Marine Corps, Coast Guard, Public Health Service, the federally recognized active National Guard, the organized reserve of the Regular Army,

the enlisted men in the Naval Reserve, the Marine Corps reserves, cadets of the U. S. Military and Naval academies, cadets in the Coast Guard academies or men who are accepted for admission thereto, and cadets of the advanced corps of the R. O. T. C. in the Army or in the Navy.

"Now, we have twenty-three medical R. O. T. C. units in the country, which means that those men in there who are in their junior and senior years will be exempt from registration. All students presently entered on college courses leading to a degree in the arts or sciences will be deferred until July 1, 1941, which means that all students who are entering courses leading to a degree are deferred for this year. However, they must register. If I understand the law correctly, then the R. O. T. C. medical students don't have to register, the assumption being that we are going to get them in the reserve corps at graduation.

"When we come over to this question of deferments, we come from a definite classification to a lot of general terms. Let me read you the statement in regard to no deferments. The law says: 'There will be no deferments made in the case of any individual except on the basis of the status of that individual, and further that no deferment shall be made of individuals by occupational groups or of groups of individuals in any plant or institution.' In other words, there will be no blanket deferments except those authorized by the law.

"It will thus be seen that the deferment of any individual whose exemption or deferment is not specifically provided by law will be decided by local boards on the merits of the case and the demonstration of the necessity for deferment. It is believed that such necessity can be demonstrated for residents and interns in hospitals, for key technical personnel in hospitals and laboratories and for officials in state, county and local health departments, and similar participants in matters of the public health.' That is a very broad provision upon which I shall not attempt to elucidate at this time.

"Furthermore, men may be granted exemption under the judgment of the local boards who are found, as individuals, to be necessary in industry, agriculture or some other occupation in order to maintain national health, safety or interest."

"I feel, as every one in the room must feel, the dire necessity of providing for the continued training of medical education in the country. Those students will be deferred for another year, but each case is going to have to be settled, under the present law, on its own present merits. As far as the men in hospitals are concerned, I would like to hark back to what I said before; namely, that there are three ways in which an appeal can be made to the classification of any man: the individual himself, his employer or the government agent who is appointed to look after the interests of the government and of the community at large. So that if the man himself doesn't appeal but if the hospital in which he is an intern or a resident thinks that he is vital and can support their case, they can request an appeal."

Dr. Edgar H. Greene, Georgia, inquired as to the status of public health officials who are also members of the reserve corps. He inquired also as to the possibilities of additional R. O. T. C. units in medical schools. Colonel Spruit pointed out that authority must be gotten from the War Department for the establishment of additional R. O. T. C. units, particularly since an appropriation would be required from Congress. He felt that this was a feeble reed on which to lean for the deferment of medical students. All men who are on the active list of the organized reserves are exempt from registration; that is, any one who is in good standing and an officer in the reserve corps will not be registered. The question was further discussed by Drs. Holman Taylor, Stanley H. Osborn and Charles H. Henninger, Pennsylvania, with respect to exemptions of public health officials.

Dr. W. D. Cutter reported on the results of the questionnaires sent to medical schools asking them to furnish the classifications of the faculty with regard to those essential to the continued conduct of the school, a second group whose presence was desired but who were less necessary, and a third group of those who could readily be spared for military duty. Fifty-seven schools have already sent lists of the faculty thus classified. Others are completing the lists just as soon as members of the faculties return from their vacations.

Dr. Alexander S. Begg, Massachusetts, reported on the work of the Committee on Mobilization of the Association of American Medical Colleges. Dr. Begg analyzed the Selective Service Act as it relates to the students. He felt that under the law deferment is made possible on presentation of information to the Selective Service boards. He also discussed the question of hospitals which are not teaching hospitals but which are necessary for community health.

Serologic Tests of Selective Service Registrants

Dr. Thomas Parran said that he thought it desirable to provide opportunity for a Wassermann test to the 16,000,000 registrants, who would report at 143,000 registration booths. Men of the ages of 21 to 35 would represent 70 per cent of the active syphilis of the nation. Some 900,000 cases might be expected to be found if it was possible to make routine tests of the entire 16,000,000 men. Of the 900,000 cases with positive reactions, about 300,000 would be infectious, he said. Difficulties represented were the lack of physicians capable of supplying 143,000 registration offices with men capable of taking blood and the volume of serologic tests which would be necessary. The American Legion had offered to give help in the clerical and other necessary work and to encourage the registrants to take the tests. Dr. Parran discussed the incidence of syphilis in this age group and proposed the following plan:

"Specifically it is proposed that the collection and examination of specimens be accomplished as follows:

"1. A team of one or more doctors and nurses to be provided at each registration point and to be responsible for the collection of the specimens. Local and state health departments should be able to obtain the services of the physician and provide the nurse in cooperation with the local and state medical societies without cost to the selective draft board.

"2. The blood specimens with the identification blank properly filled out to be sent to the nearest public health laboratory where serologic tests for syphilis are performed. Such laboratories should be notified, if possible, ten days to two weeks in advance of the approximate dates of registration in order that routine serologic work may be set at a minimum during the registration.

"3. The men whose blood specimens proved to be negative by serologic test should be notified directly regarding the laboratory findings. The men who have positive or doubtful serologic tests should be directed by mail to report to the physician or clinic named on the original identification slip which was forwarded from the collection point to the state laboratory. The positive or doubtful report should be sent to the man's physician or clinic in order that the proper physical examination may be performed to supplement evidence obtained through serologic examination of the blood and necessary to confirm the diagnosis of syphilis.

"4. Individuals found to be infected with syphilis may according to circumstances arrange for treatment either from their own physician or from public clinics, of which there are approximately 2,500 at various places throughout the United States."

He stated that the plan has the approval of the Subcommittee on Venereal Diseases of the National Research Council, and it was hoped that the American Medical Association would encourage the plan through its affiliated state and county medical societies, thus securing the cooperation of the physicians.

In the discussion Dr. Samuel J. Kopetzky stated that the matter had been brought before the Medical Society of the State of New York and that it was the feeling of the council that the Selective Service Act, with its registration and its examination, is a new procedure and it would be unwise to complicate it with public health activities. Such complication would confuse the public and give newspapers and other agencies not favorable to Selective Service an opportunity to condemn the entire procedure. It was felt, however, that a serologic program could be conducted for the 400,000 men who would be accepted and inducted into service. Dr. George M. Smith, Connecticut, and Dr. Arthur T. McCormack, Kentucky, commented on the plan, the statement by Dr. McCormack ending with a recommendation for its adoption.

AFTERNOON SESSION

Resolution on the Rehabilitation of Men
Disqualified for Service

Dr. Parran of the U. S. Public Health Service presented a statement prepared by a committee of the Conference of State and Territorial Health Officers concerning the rehabilitation of men found disqualified for service by reason of physical defects. The following resolution, offered by the committee of the Conference of State and Territorial Health Officers, was read. Dr. Parran suggested that the resolution be a possible subject for future consideration by the Committee on Medical Preparedness:

Resolved, That persons who are otherwise found to be satisfactory and available for induction into the land or naval forces of the United States for training and service as provided by the Selective Service Act but who are deferred because of physical defects or ailments which are readily amenable to treatment and cure as stipulated by regulations which may be prescribed by the President may, on application to the Public Health Service, be considered and accepted for such treatment as beneficiaries of that service for the correction of such physical defects or ailments.

Relations of Committee on Medical Preparedness
to Governmental Agencies

Dr. Morris Fishbein stated that a chart is being prepared which will clearly show the relation of the various bodies and committees which have been formed, indicating also just where official power lies, where advisory power lies and which bodies are without authority. He said that, while various governmental agencies had requested the American Medical Association to aid them in mobilizing medical personnel, the Committee on Medical Preparedness appointed by the Association for that purpose has no authority to order anybody into service but can only find out if an individual wants to go into the service and furnish such names to the government. The punch card system on which the Committee on Medical Preparedness is working is of real value only if it is complete. Obviously a good job cannot be done if there is on the punch cards only 75 per cent of the doctors who are available. The very first job, therefore, Dr. Fishbein said, that lies before the state chairmen when they return home is to obtain the return of all the questionnaires of the medical preparedness committee which have been sent out to individual physicians, in order that the punch card system may be complete. This work of mobilizing medical personnel is greatly complicated by the fact that there are innumerable medical organizations in the field; for example, some of the boards in the specialties have urged that physicians be not recommended for service on any board as specialists unless they hold a certificate from the examining board. This would be most difficult to follow in some states. Other complications that were mentioned were the needs of industrial medicine, the promotion of public health activities in relation to the military emergency, and the question of medical students. The needs of the military service obviously come before every other demand.

Intensification of Medical Education

Dr. William D. Cutter said that the Council on Medical Education and Hospitals as yet has no specific plans for the intensification of medical education in relation to the Conscription Act. The Council has not met since this bill was enacted. Certain medical schools, however, have been considering the lengthening of their school year so that the course can be completed in three calendar years rather than in four. Some schools are already operating on that plan and it would be very difficult for others to adopt that plan.

Dr. Alexander S. Begg pointed out that a group interested in the venereal disease problem had sent a memorandum to all medical schools suggesting an intensive two weeks course be offered to physicians who are able to go into the service. He suggested that probably the orthopedists and various other groups might want short intensive courses given also.

Dr. Olin West brought out that various groups are attempting to exert influence in Washington in behalf of plans for the extension of what they call medical education. Indeed, a bill has been introduced in Congress designed to care for the interests of one unrecognized medical school. Certain commercial groups are trying to exert pressure in the same direction in Washington. Great pressure is being brought in behalf of

certain cult practitioners in an endeavor to have them recognized in the same way as doctors of medicine are to be recognized.

Physicians to Serve the Civilian Population

Dr. West stated that under the plan adopted by the Committee on Medical Preparedness it is provided that county medical societies shall be active in the selection of physicians whose services would be more valuable among the civilian population at home than they would be if these men were called into active military service. In some states it appears that no county committees have been appointed. Dr. West said that this matter of appointing county committees should receive prompt consideration at the hands of the state committees.

DISCUSSION

In the discussion Dr. Samuel Kopetzky said that in each county of the state of New York there is already a medical preparedness committee which places a confidential notation on every questionnaire as to the value of a physician, as to his need in the community or whether he is better suited to serve in the federal service, as a reserve officer, as a public health officer, in industrial medicine in plants, in the Home Guard or in some other category.

Dr. Roy W. Fouts of Nebraska said that the plan of appointing county committees would not work in Nebraska, as there are some counties in that state which do not have even one physician, much less a county medical society, and that the same holds true for a number of the Western states. Dr. Fouts suggested that this matter be handled in Nebraska through the councilor districts rather than on an individual county society basis.

Dr. Holman Taylor of Texas said that he was one of a committee of this kind during the last war and that they went into communities where there were doctors to spare and induced those doctors to go to other sections of the state of Texas where doctors had been sent into active military service. He raised the question whether these county society committees would actually have the authority for making such decisions as this; that is, would the higher authorities endorse the county society method of selecting those that are best qualified to serve among the civilian population.

Dr. Charles W. Maxson of Maryland read a questionnaire which one of the county chairmen in Maryland had sent out to every doctor in that county.

Capt. D. G. Sutton, U. S. Navy Medical Corps, suggested that this is a national question and comes within the purview of the new coordinating committee established by executive order. This committee, he said, could outline a definite policy that could be applied to all the states after having received from the states information that would serve as a background for determining the final action.

Colonel Love said that a careful reading of the original proposal submitted by Colonel Dunham before the House of Delegates of the American Medical Association in New York last June would clear up many of the points being raised at this time. The Surgeon General's Office has proposed to the War Department that all calls for physicians beyond those who are available in the National Guard and in the reserve corps would be supplied through the Committee on Medical Preparedness of the American Medical Association; for example, a corps area commander who requires a surgeon or internist or some other kind of doctor would transmit his call to the Committee on Medical Preparedness of the American Medical Association in Chicago. The reason for that plan is that there may be many more troops in a certain corps area than can be supplied with the number of doctors from that corps area, but when a call comes into the central committee for doctors they can say to some state that it is their turn to furnish the type or types of doctors required. The Surgeon General's Office has suggested to the Secretary of War, as well as to the Committee on Medical Preparedness, that the Surgeon General have representatives on duty with this committee in Chicago so that he may give official sanction to recommendations made by this committee, which in turn will be transmitted to the state and county medical societies. Dr. James R. Bloss of Huntington, W. Va., said it could be made a simple matter for the doctors of the country to take

care of the civilian population. In the World War he and his associate asked each new patient that came to their office "Is your doctor in the service? and if the patient said yes, his name was written in red ink in their books and any amount collected from the patient was sent to that doctor's family. When physicians who were called into service returned to the community, he said to their patients "Your own doctor is back now, go over and see him." Dr. Bloss and his associates feel that this question is a personal matter to a large extent.

Dr. Olin West again emphasized the importance of completing the organization of medical preparedness committees in the county societies, which he hopes will be perfected soon in every state. There will be some things in each local situation that will have to be carefully supervised by the state committees on medical preparedness.

Dr. F. Webb Griffith of North Carolina inquired if the states are going to get duplicates of the punch cards of the central Committee on Medical Preparedness. Dr. West replied that, in view of the great pressure of trying to get this information transferred to these cards, it was doubtful whether the committee could undertake to provide the states with duplicates at any time very soon. He pointed out that the county committee should know better than anybody else which physicians can best stay at home and who might be essential for civilian service.

Dr. F. L. Smith of Minnesota said that to date they had received back 83.5 per cent of 2,600 cards sent out to physicians in the state. It is necessary, he said, to make a personal canvas, and this was being done in Minnesota through the county societies, which with the councilors have a list of all physicians in their district. In Minnesota they have a committee comprising one member for every district so that between the representative of the military committee, the county chairman and the councilor they expect to get the information desired from every physician in the state, even if necessary to make a house to house call. Minneapolis and St. Paul are already sending their representatives to interview personally men who have not returned their cards.

Dr. J. N. Davis of Idaho asked What is an acceptable per capita need of the civilian population for physicians? Dr. Olin West said that the question is difficult to answer. Should an epidemic develop as it did in 1918, there is no way of figuring out the per capita need for physicians. In a situation of that kind and in less serious situations among the civilian population we have to meet the situation that exists, and all that one can do is to do the best without reference to per capita needs.

Dr. George H. Phelps of Wyoming said that a plan which would work in one state might not work in another state. It may be well, he said, to leave this to the discretion of the Coordinating Committee in conjunction with the Committee on Medical Preparedness to work out definite ideas which can be submitted to the various states.

Dr. Fishbein referred to Colonel Love's statement at the morning session that the immediate needs probably can be taken care of out of the reserves as long as we are not actually engaged in war. Should the government declare war, this problem could not be handled without some sort of conscription that would reach physicians and provide authority to reach those physicians who are actually needed in the service, as well as to give authority to somebody to declare just who ought to stay at home and who ought to go into active service. The time is not ripe, Dr. Fishbein said, to confer that authority on any one. Dr. Olin West emphasized that while we may not be going to decide at present just who is going to stay at home and who isn't, we ought right now to be working out a plan to provide for the civilian and the industrial needs, and to this suggestion Dr. Arthur McCormack of Kentucky agreed.

Plans to Secure Return of Physicians' Schedules

Dr. R. G. Leland, whose department in the headquarters of the American Medical Association is conducting the survey of physicians for the Committee on Medical Preparedness, pointed out again the necessity for a 100 per cent return of schedules that have been sent to physicians. No state as yet had reached that point. Various means have been used by different states to secure a complete return of schedules, but it will be necessary to exert still more ingenuity and pressure on those who are tardy in returning their schedules. These schedules are needed

even though the physician has supplied the information to the Army or Navy as members of the Officers Reserve Corps. Only by having a complete list will the Committee on Medical Preparedness be able to serve the armed forces in the best manner. Dr. Leland believes that ultimately personal visitation committees will be required in most communities to follow up those men who do not respond with their questionnaires. In their effort to complete the survey of physicians, many states have asked the committee for lists of physicians who have already returned their schedules in order that they might learn the names of those who have not returned them. The preparation of such lists entails much work, for it is necessary to check all of more than 100,000 schedules that have been returned. It is especially requested that state and county committees do not ask for such lists, as that would be especially time consuming. If there are other methods which are better than preparing a list of those who have not responded, anything that can be done to assist the states in getting a full return to their questionnaires will be gladly done.

In reply to a question from Dr. Charles R. Bird as to how soon the checking of the state lists could be had by individual states, Dr. Leland replied that it probably would take from ten days to two weeks at least to make this check. In response to the question whether they have a list made up of those who have filled out the questionnaires, the answer was yes, except in a few states in which the number of returns is less than 50 per cent.

Dr. Hugh H. Trout of Virginia said that a great deal of this work in his state had been completed with the aid of the woman's auxiliaries. The women have gone out to their doctor husbands and friends and had them turn in the necessary information.

Another plan has been adopted for states in which there are comparatively few physicians, namely the sending out directly from Association headquarters of a second request for the information desired. That has been done in seven or eight states and the response to the second request has been very satisfactory.

Colonel Spruit pointed out that the regulations on physical examinations have recently been printed by the army and that he hoped that the examining boards would read and apply them.

Dr. Stanley H. Osborn asked whether the different state chairmen can get from the Committee on Medical Preparedness a list of the physicians who would volunteer for active service. Dr. Leland replied that on request a list could be prepared of those who are willing to volunteer for service.

Relation of Committee on Medical Preparedness to Other Agencies

Colonel Love stated that the Surgeon General's Office feels that the American Medical Association should be able to speak for the medical profession and that it is the wish of that office at present to coordinate, as far as possible, the work of medical preparedness through the central Committee on Medical Preparedness appointed by the American Medical Association.

The Neuropsychiatric Problem

Dr. Parran stated that, if the methods of physical examination to be followed in the current emergency are the same as those followed in the World War, and if no more of the potential psychiatric cases are excluded than in the last war, then we can expect 2.2 per cent of all men inducted into the service to become wards of the government and to receive treatment and compensation at its hands for the next twenty years following their induction. An estimate of the cost to the government of every case of this kind, including the cost of buildings, compensation and other expenses involved to take care of them, amounts to \$30,000 per case. If the same figures apply to the men to be inducted for training in the next few months, the total cost over the next twenty-two years to the government for the probably 22,000 neuropsychiatric patients would be 660 million dollars. Dr. Parran pointed out that in the last draft, in many places, the draft boards were too willing to send to the army the problem boy, the shiftless fellow, the ne'er-do-well, and that it should be possible for the local draft boards, the medical advisory boards and finally the induction boards to give more attention to this particular problem, to which he hopes the Committee on Medical Preparedness will give further consideration.

New York's Plan to Protect the Doctor in Active Service

To protect the doctor who goes into active military service, and to make it easier for him to fulfil that obligation, New York has adopted, Dr. Kopetzky said, the "Bower plan," whereby the physician going into the service notifies his county society officers, who set up a fund in which the money collected by the substitute doctor is deposited minus a certain percentage for overhead, and that fund is administered by the county medical society. Certain hospitals also have established funds within the hospital in the same way. Thus the patients of the physician who goes in the service will be taken care of by those who remain at home and the physician or his family will get the money collected by the substitute physician, less a certain per cent for overhead. Under a tax ruling in the third tax district in New York, these funds are taxable as income and when the funds are distributed to the doctors who go into the service they must register it in their income tax returns and it is again taxed. Now what is needed is an executive ruling from the Secretary of the Treasury that such funds shall either be taxed at the source or at the time the recipient gets the money. Dr. Kopetzky requested that the Committee on Medical Preparedness take this matter up with the proper treasury official, so that it may be straightened out. In reply to a question from Dr. Charles E. Hunt of Oregon, it was said that the amount deducted for overhead in some instances is 5 per cent but that it depends entirely on the local conditions, and in the case of some of the sponsored hospitals there will be no overhead charge.

Short Intensive Training Courses

The subject of short intensive training courses for doctors who are going into active service brought forth an extensive discussion. Colonel Love said that there ought to be several short intensive courses of training and that the Committee on Medical Preparedness might coordinate them and carry those courses of training through the medical schools and hospitals. Dr. Fouts suggested that all doctors up to 50 or 55 years of age who are physically fit be given a short intensive military training course. Dr. Taylor of Texas approved the suggestion. Dr. Robert Mueller of Missouri said that in the last war the percentage of decorations which doctors received in the army was greater than that of any other similar group of officers throughout the United States forces.

Dr. Edgar H. Greene of Georgia believed that the older physicians should not be subjected to intensive physical hardships but that the young physician should. The older physician who had no military training, however, should be given a course in military affairs pertaining to the manual of the medical department and the army regulations, in order to become acquainted with the paper work; he recommended in seven districts of the state of Georgia that they set up courses to instruct interested physicians along this line.

Interns and the Reserve Corps

After conferring with Colonel Love, Dr. Cutter suggested that, as soon as orders have been issued permitting the increase in the Medical Reserve Corps, it might be advisable to notify all hospitals approved for the training of interns to inform the interns that an opportunity is given them to request commissions in the Reserve Corps with the understanding that they will be expected to complete their intern service before being called into active duty. If that plan meets the approval of the Surgeon General's Office, Dr. Cutter, in behalf of the Council on Medical Education and Hospitals, said he would gladly bring it to the attention of each one of the nearly 1,000 hospitals in the country approved for intern training.

Colonel Love, in reply to a question, stated that commissions will not be granted to applicants unless they are graduates of class A medical schools.

Certificates for Physicians Compelled to Stay at Home

Dr. Harrison Shoulders of Tennessee suggested that some sort of token or certificate be issued to physicians of military age and physically fit who had volunteered for service but were compelled by the proper authority to remain at home where their services were needed. A motion was adopted to the effect that

the Committee on Medical Preparedness design and award a badge for those physicians referred to who cannot enter the active military service.

Lists of Local Examining Boards

In reply to a previous question concerning tentative lists of men assigned to local examining boards, Dr. Greene said that all one has to do to get these lists is to go to the adjutant general's office in his state and find out there what doctors have been selected for these local boards, as a mobilization plan has already been set up for several months in the states. These lists, therefore, can easily be prepared and sent in to the Committee on Medical Preparedness in Chicago.

Brief Conferences of State Chairmen

After announcements from various state chairman of requests for brief conferences with the other state chairmen in their corps areas immediately following this meeting, and that the Committee on Medical Preparedness would hold an official meeting at 6:30 p. m., the conference meeting was adjourned.

COMMITTEE ON MEDICAL PREPAREDNESS

Report of Session, Chicago, Sept. 20, 1940

Present at the session of the Committee on Medical Preparedness of the American Medical Association, held in Chicago, September 20, were:

Dr. James E. Paullin, Acting Chairman	Dr. Arthur W. Booth
Dr. Charles A. Dukes	Dr. Olin West
Dr. Roy W. Fouts	Dr. Morris Fishbein
Dr. John H. O'Shea	Dr. R. G. Leland
Dr. Stanley H. Osborn	Dr. E. L. Henderson
Dr. Walter G. Phippen	Dr. R. L. Sensenich
Dr. Fred W. Rankin	Dr. Thomas S. Cullen
Dr. Harvey B. Stone	Colonel Albert G. Love
Dr. Sam E. Thompson	Dr. H. H. Shoulders
	Dr. James R. Bloss

Dr. Paullin discussed the manner in which physicians would be selected for the induction boards. Dr. Fishbein indicated the necessity for having exact names for each of the various committees of the boards to be appointed. It was agreed that Medical Advisory Board would be the name adopted for the physicians appointed in the states to act as appeal boards from local draft decisions and that the board appointed by the Army to give the physical examinations for conscripted men before entrance into military service would be known as the Medical Induction Board. It was pointed out that it was quite possible for a physician to serve on the appeal board, which is the body appointed to act as a legal board in passing on appeals from decisions of local draft boards, exactly as a physician may also be a member of a local draft board in a capacity as a citizen rather than in a medical capacity.

Colonel Love pointed out that in some instances induction boards might travel to sparsely populated areas to conduct physical examinations rather than to have the men who were conscripted sent to the center where the induction board would hold its sessions.

COMPENSATION FOR MEDICAL SERVICES

Extended discussion brought the conclusion that physicians would volunteer their services for local boards and medical advisory boards. Colonel Love explained that the specialists who would serve on induction boards would be paid as being in the military service. By vote the conference recommended that physicians volunteer their services to local and medical advisory boards. It was also voted that a subcommittee be appointed to consider the amounts and charges to be made for special

laboratory services for local and medical advisory boards in the field of radiology and clinical pathology.

Action was also taken to the effect that a two thirds vote of the committee in case of mail vote would be considered as constituting approval.

The compensation for members of medical induction boards was recommended to be that of the rank of major, with allowances.

MECHANISM OF APPOINTMENT OF MEMBERS OF INDUCTION BOARDS

The committee recommended that members of induction boards be appointed by nomination from the state chairmen to the headquarters of the Committee on Medical Preparedness, which would then supply acceptable lists to the corps area commanders. Dr. Leland presented the system of tabulation by which men acceptable in the various specialties will be listed so as to be available for this purpose.

CORRECTION OF DEFECTS IN MEN REJECTED FOR PHYSICAL REASONS

It was moved and approved that the committee recommend to the Selective Service draft boards that registrants rejected on account of physical defects be given a statement on request as to the nature of the defects for which they were rejected.

INCOME TAX

On motion and approval it was recommended to the Treasury Department that the resolution of Dr. Kopetzky with regard to income tax be approved and that the taxes on such funds be allocated either at their source or to the individual but not to both.

SEROLOGIC EXAMINATION OF REGISTRANTS

After extended discussion it was moved and approved that the committee defer any action on the question of serologic tests for registrants. It was also moved and approved that a serologic test be a part of the examinations to be made by induction boards.

THE STATUS OF NEGRO PHYSICIANS

The secretary presented a communication received from the committee representing the National Medical Association as to the status of Negro physicians in medical military preparedness and requesting membership of Negro physicians on the Committee on Medical Preparedness. The committee endorsed a reply of the Board of Trustees to the effect that the Committee on Medical Preparedness had been appointed by the House of Delegates and that it would be impossible to change the membership of that committee until a further action of the House of Delegates became possible.

INSPECTION OF SCHOOLS OF PHYSICAL THERAPY

The secretary presented a request from the Committee on Physical Therapy of the National Research Council that the Council on Medical Education and Hospitals of the American Medical Association inspect schools of physical therapy for their ability to provide physical therapy technicians and physicians specializing in physical therapy for military needs. It was moved that the communication be received and referred to the Council on Medical Education and Hospitals with approval.

PREPARATION OF WAR MANUALS

The secretary presented a communication relative to the preparation of manuals dealing with medical subjects for the use of the medical military services. This

communication was referred to the Committee on Information of the National Research Council, which has these matters in hand.

OFFICIAL STATUS OF THE COMMITTEE ON MEDICAL PREPAREDNESS

After discussion it was approved that the Executive Committee of the Committee on Medical Preparedness be authorized to present to the Coordinating Committee on Medical Preparedness of the Council on National Defense the needs of the Committee on Medical Preparedness as far as concerns any budget and the establishment of suitable status for the committee in relation to the Coordinating Committee.

AMERICAN PHYSICIANS VOLUNTEERING FOR SERVICES IN THE UNITED KINGDOM

A communication was presented by the secretary from the secretary of the British embassy requesting that announcement be made to the effect that "The registration and selection of American volunteer doctors for duty in the Emergency Medical Service in the United Kingdom will in the future be undertaken by the American Hospital in Britain, Limited, 321 East Forty-Second Street, New York City. Dr. Foster Kennedy, together with an advisory board of this organization, will be in direct communication with the Ministry of Health in England concerning all these matters."

LECTURES ON MEDICAL PREPAREDNESS

The speakers for current lectures in the course on medical preparedness presented by the Philadelphia County Medical Society have been announced as follows:

Lieut. Col. Arthur P. Hitchens, Medical Corps, U. S. Army, professor of military science and tactics, Concentrations of Civilian Personnel—Epidemiologic Aspects, Contagious and Venereal Disease Problems, October 3.

Edwin W. Adams, associate superintendent of schools, Expected Psychiatric Problems in a Mobilization, October 10.

Dr. William Bates, Surgery of War as Contrasted with Industrial Surgery, and Dr. James B. Mason, Mechanism of Wound Production by Projectiles, October 17.

Station WDAS in Philadelphia is broadcasting a part of each of these lectures on Thursday afternoons.

THE BRITISH NEED SURGICAL SUPPLIES

The Medical and Surgical Supply Committee has issued an appeal to doctors to join a nationwide campaign for medical and surgical supplies to equip emergency stations and field hospitals to relieve the present medical crisis in England. The British Red Cross has cabled that it urgently requires surgical instruments of all kinds and five tons of plain lint and two tons of boric lint. The Medical and Surgical Supply Committee, which is sponsored by a group of physicians, acknowledges donations of medical supplies from several large pharmaceutical and instrument companies; also some gifts for funds from various parts of the country. The committee hopes to equip 500 emergency stations, as well as field hospitals. A first aid post can be equipped for \$500. Contributions should be made out to the treasurer of the Medical and Surgical Supply Committee, Arthur Kunzinger, of the Chase National Bank. The headquarters office of the committee is at 420 Lexington Avenue, New York City.

ORGANIZATION SECTION

OFFICIAL NOTES

ADDRESSES BY OFFICIAL STAFF

DR. PAUL C. BARTON:

- October 22—Southwest Missouri State Teachers College, Springfield, Mo.
- October 22—Woman's Auxiliary to the Greene County Medical Society, Springfield, Mo.

DR. W. W. BAUER:

- October 5—County School Teachers, La Porte, Ind.
- October 6—Health Education Institute, American Public Health Association, Detroit.
- October 8—American Public Health Association, Detroit.
- October 10—Northeast Lions' Club, Detroit.
- October 11—Joliet Woman's Club, Joliet, Ill.
- October 17—West Virginia State Nurses Association, Clarksburg.
- October 27—Academy of Medicine and the Monroe County Medical Society, Rochester, N. Y.
- October 29—Indiana State Medical Society, Woman's Auxiliary, French Lick, Ind.

DR. MORRIS FISHBEIN:

- October 4—Medical Faculty University of Minnesota, Minneapolis.
- October 7—Military Training Unit, University of Minnesota, Mayo Foundation, Rochester, Minn.
- October 10—University of Nebraska, Lincoln.

- October 24—Inauguration of new president, Ohio State University, Columbus.

DR. EDWIN P. JORDAN:

- October 11—Will-Grundy County Medical Society, Joliet, Ill.
- October 23—American College of Surgeons and American Association of Medical Record Librarians, Chicago.

DR. FRANK H. LAHEY:

- October 9—Middlesex South District Medical Society, Cambridge, Mass.
- October 18—Inter-State Postgraduate Assembly, Cleveland.
- October 21—American College of Surgeons, Chicago.
- October 30—Indiana State Medical Society, French Lick, Ind.

DR. PAUL A. TESCHNER:

- October 11—Grant Hospital, Chicago.
- October 14—University of Illinois, Chicago.
- October 16—Methodist Church, Lombard, Ill.
- October 31—Men's Bible Class, Austin Methodist Episcopal Church, Chicago.

DR. NATHAN B. VAN ETEN:

- October 7—Wayne County Medical Society, Detroit.
- October 16—Inter-State Postgraduate Assembly, Cleveland.
- October 20—The Cathedral at Boston.
- October 22—Bronx County Medical Society, New York.
- October 28—Oklahoma Medical Association, Oklahoma City.

MEDICAL LEGISLATION

MEDICAL BILLS IN CONGRESS

Changes in Status.—H. R. 960, proposing to extend the classified executive civil service of the United States, has passed the Senate, with amendments. Senator Hatch, New Mexico, submitted the following amendment, which was adopted by the Senate: "In appointing, or fixing requirements with respect to the appointment of, persons to any civil position in the government service no officer or employee of any executive department, independent establishment or agency (including government-owned, government-controlled corporations) of the United States shall discriminate against any applicant or deny to any applicant the privilege of taking any competitive examination held for the purpose of determining the qualifications of applicants for such position, because such applicant (1) has not been graduated from a particular school; (2) has not been graduated from a school which has been approved or accredited, or assigned a particular rating or classification, by any association, organization, or group; or (3) is not a member of any professional, technical, or other society or association." This bill will be further considered by a conference committee, composed of conferees on the part of the House and Senate. The Hatch amendment, if it remains in the bill, will open the way for the appointment of graduates of unapproved medical schools to any civil position in the government service. H. R. 6450 has been reported to the Senate, proposing to establish certain rights for combat veterans of wars of the United States. The bill provides, in part, that where a veteran is shown to have been engaged in combat with an enemy of the United States, or during service in some war, campaign or expedition, to have been

subjected to other arduous conditions of military or naval service, such disability as can reasonably be considered to have been due to or aggravated by the conditions of all of his active military or naval service shall be determined to be directly due to or aggravated by such service in line of duty, unless the contrary is shown by clear and unmistakable evidence. S. 4224 has passed the Senate, providing that in time of war or during an emergency declared by the President or by Congress the Secretary of War may, in his discretion, dispense with any of the examinations for promotion in the Regular Army of officers of the Medical, Dental and Veterinary Corps, except those relating to physical examinations.

Bill Introduced.—S. 4371, introduced by Senator Schwelbach, Washington, proposes that the United States Public Health Service shall provide for the care and relief of sick and disabled persons (1) employed on board any registered, enrolled or licensed vessel of the United States in the performance of duties of a workshop character or (2) employed or engaged in commercial fishing on board any such vessel or on board any boat operating from any such vessel as a base.

DISTRICT OF COLUMBIA

Bill Introduced.—S. 4376, introduced by Senator Byrd, Virginia, provides that, notwithstanding any limitation relating to the time within which an application for a license must be filed, the Commission on Licensure to Practice the Healing Art in the District of Columbia is directed to issue a license to practice chiropractic to Lou Davis on condition that he shall be found by the commission to be otherwise qualified to practice under the provisions of the healing arts practice act.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Plague Infection.—According to *Public Health Reports*, plague infection was proved in a pool of 129 fleas from fifteen ground squirrels (*C. fisheri*) submitted to the laboratory on July 15 from Arrowhead Dump, 1 mile east of Lake Arrowhead, San Bernardino County.

Society News.—The Los Angeles Society of Ophthalmology and Otolaryngology was addressed, September 23, by Drs. George L. Kilgore, San Diego, on "Repair of Corneal Scar"; John N. N. Osburn, Los Angeles, "Fifteen Years' Experience with Intra-Ocular Foreign Bodies," and Lieut. Thomas L. Allman, U. S. Navy, "Physical Requirements for Naval Aviation."—The Los Angeles Cancer Society was addressed, September 30, by Drs. Robert S. Stone and John H. Lawrence, San Francisco, on "Neutrons in the Treatment of Cancer" and "Artificial Radioactive Substances in Relation to Clinical Medicine," respectively. Paul C. Aebersold, Berkeley, spoke on "Modern Nuclear Physics and Cancer Therapy."—Dr. Robert E. Wyers presented a "Study of 260 Cases of Mongolism with Special Reference to Congenital Heart Lesions" before the Los Angeles Society of Neurology and Psychiatry, September 18, and Dr. David L. Reeves, "Amyotonia Congenita of Oppenheim: Report of Case with Autopsy."—Dr. Karl A. Menninger, Topeka, Kan., discussed "Eye and the Flying Dutchman: A Psychiatric Study of a Certain Aspect of the Relations Between Men and Women" before the Hollywood Academy of Medicine, September 12.

DISTRICT OF COLUMBIA

Annual Scientific Assembly.—The Medical Society of the District of Columbia will conduct its annual scientific assembly at the Mayflower Hotel, Washington, October 15-17, selecting for the theme this year cardiovascular renal diseases. The following doctors will speak:

Richard Schatzki, Boston, Roentgen Diagnosis in Cardiovascular Disease.
Raymond Hussey, Baltimore, Some Interesting Electrocardiographic Interpretations.
Helen B. Taussig, Baltimore, Congenital Heart Disease.
Thomas Duckett Jones, Boston, Acute Rheumatic Carditis.
Harry H. Donnelly, Washington, Management of the Child with Inactive Rheumatic Heart Disease.
Edward F. Bland, Boston, Differential Diagnosis of Congenital and Rheumatic Heart Disease in Children.
Walter A. Bloedorn, Washington, Recognition and Treatment of the Various Forms of Pericarditis.
Wallace M. Yater, Washington, Diseases of the Aorta.
Isaac Alexander Bigger, Richmond, Va., Diagnosis and Treatment of Heart Wounds.
George Louis Weller Jr., Washington, Surgical Shock and Circulatory Failure.
Thomas S. Lee, Washington, Hypertensive Heart Disease.
William Thornwall Davis, Washington, Changes in the Fundus Oculi in Cardiovascular Disease.
Edward Weiss, Philadelphia, Renal Involvement in Hypertensive Vascular Disease.
Maurice Charles Pincoffs, Baltimore, Cardiac Aspects of Chronic Nephritis.
Joseph Earle Moore, Baltimore, Cardiovascular Syphilis.
Howard B. Sprague, Boston, Clinical and Electrocardiographic Findings in the Aging Heart.
James Edwin Wood Jr., Charlottesville, Va., Diagnosis and Treatment of Cardiac Arrhythmias.
James Alexander Lyon, Washington, Failure of the Left and Right Sides of the Heart.
Harry Gold, New York, Digitalis: Its Action and Usage.
Ralph M. LeComte, Washington, Cardiovascular Complications of Prostatic Obstruction.
Joseph B. Wolfe, Philadelphia, Recognition and Management of Cardiac Neurosis.
Harold M. Marvin, New Haven, Conn., Diagnostic Criteria of Coronary Artery Disease.
Edwin Cowles Andrus, Baltimore, Acute Coronary Thrombosis.
Arthur M. Master, New York, Role of Effort, Trauma, Work and Occupation in the Onset and Subsequent Course of Coronary Occlusion.
Irving Sherwood Wright, New York, Diagnosis and Conservative Treatment of Peripheral Vascular Diseases.
Norman E. Freeman, Philadelphia, Surgical Treatment of Peripheral Vascular Disease.
Achilles L. Tynes, captain, medical corps, U. S. Army, The Heart During Anesthesia.

The program also includes a hobby show and luncheons to be addressed by Major Gen. James C. Magee, surgeon general of the U. S. Army, and Edward M. Curran, U. S. Attorney for the District of Columbia. There will be a public meeting Wednesday evening.

GEORGIA

Society News.—The Fulton County Medical Society was addressed in Atlanta, September 19, by Drs. Hulett H. Askew and Rufus A. Askew on "Hemorrhoidectomy." Dr. Cyrus W. Strickler Jr. gave a clinical talk on "Intravenous Sodium Sulfapyridine Monohydrate in Pneumonia." The society was addressed, September 5, among others, by Drs. William R. Crowe Jr. and Gene Nardin, Atlanta, on "Hyperparathyroidism."

Annual Industrial Meeting.—The third annual meeting of Georgia Association of Industrial Surgeons was held at the Ansley Hotel, Atlanta, September 25. Among the speakers were:

Dr. McIver Woody, New York, Industrial Medicine as a Specialty.
Dr. Lloyd Noland, Birmingham, Ala., subject not announced.
Drs. Edward C. Holmblad and Kenneth L. Matson, Chicago, Gas Gangrene, Plea for Better Prophylaxis.
Dr. Cleveland D. Wheelchell, Gainesville, Chest Surgery.
Dr. Benjamin H. Minchew, Waycross, Eye Injuries in Industry.
Dr. Samuel F. Rosen, Savannah, Occupational Dermatoses.
Dr. W. Whatley Battey, Augusta, Hernia.
Dr. Frank K. Boland, Atlanta, History of Fractures.

ILLINOIS

Physicians Honored.—Drs. Eugene D. Bergeron and Aaron S. Eshbaugh, both of Kankakee, were honored at a meeting of the Kankakee County Medical Society, September 10, marking their completion of fifty years in the practice of medicine. Both physicians were accorded special recognition for service to their community and given certificates and pins from the Illinois State Medical Society. Dr. Bergeron graduated at Chicago Medical College, now Northwestern University Medical School, in 1881. Dr. Eshbaugh graduated at Hahnemann Medical College and Hospital, Chicago, in 1886. Both have been practicing in Kankakee for about forty years.

Chicago

Annual Prize of Surgical Society.—Manuscripts for the third award of the annual prize of \$250 of the Chicago Surgical Society should be submitted to the secretary not later than March 1, 1941. The prize is awarded to a young man devoting himself to surgery in Chicago, who is not a member of the Chicago Surgical Society, for meritorious work in one or both of the fields of experimental and clinical surgery. Certain qualifications must be met in the judging of the papers. Additional information may be obtained from the secretary, Dr. Michael L. Mason.

KENTUCKY

Society News.—Dr. Robert Julian Estill, Lexington, addressed the Woodford County Medical Society, Versailles, September 6, on "Diseases of the Newborn."—Dr. William B. Moore addressed the Harrison County Medical Society, Cynthiana, September 2, on "Treatment of the Failing Heart."

State Medical Election.—Dr. Elmer L. Henderson, Louisville, was named president-elect of the Kentucky State Medical Association at the annual meeting in Lexington in September, and Dr. Austin Bell, Hopkinsville, became president. Vice presidents elected were Drs. William R. Parks, Harlan; Ernest Lee Heflin, Louisville, and William E. Gary, Hopkinsville. The 1941 meeting will be in Louisville.

Personal.—Dr. Andrew B. Steele has resigned as clinical director of the Western State Hospital, Hopkinsville, to join the staff of the Indiana state welfare department, it is reported. —Dr. William G. Morgan, Cadiz, health officer of Trigg and Lyon counties, has been appointed health officer of Daviess County, with headquarters in Owensboro. He succeeds Dr. William Lee Tyler Jr., who has been part time health officer. —Dr. Jerauld A. Campbell, Niagara Falls, N. Y., has been appointed health officer of Grayson County. —Dr. Mildred E. Burton, Berea, has been appointed health officer of Owsley County.

LOUISIANA

Dr. Musser Named President of State Board of Health.—Dr. John H. Musser, professor of medicine at Tulane University of Louisiana School of Medicine, New Orleans, has been appointed president of the Louisiana State Board of Health to serve on a part time basis until January during the reorganization of the board. Dr. Musser succeeds Dr. Joseph A. O'Hara, who resigned after holding the position since 1928. The change was to be effective September 1, newspapers reported. The appointment of Dr. Robert H. Onstott, U. S. Public Health Service, as executive officer of the board was also announced. In this capacity, on a full time basis, he will act as medical consultant in the reorganization of the board.

MICHIGAN

The Business Side of Medicine.—A symposium on the business side of medicine was a feature of the seventy-fifth annual meeting of the Michigan State Medical Society, Detroit, September 24. It was arranged especially for the secretaries and office assistants of members of the state society with Dr. Allan W. McDonald, Detroit, president, Wayne County Medical Society, presiding. Dr. Paul R. Urmston, Bay City, then president-elect of the state society, gave an address of welcome. Other speakers included:

Mrs. Marjorie Euler, Topeka, Kan., The Highlights of Twenty-Five Years of Service.
Miss Maxine Robinson, Muskegon, Organizing the Medical Assistants' Society of Muskegon County.
J. D. Laux, executive director, Michigan Medical Service, Detroit, How to Bill Michigan Medical Service.
Dwight Anderson, L.L.B., New York, director, public relations bureau, Medical Society of the State of New York, What Every Woman Knows.

Postgraduate Programs.—A series of postgraduate courses for practicing physicians will soon begin throughout Michigan under the auspices of the Michigan State Medical Society, University of Michigan Medical School, Ann Arbor; Wayne University College of Medicine, Detroit; and the state department of health, Lansing. The programs will be conducted at the following places:

Ann Arbor, October 10, 17, 24, 31.
Battle Creek-Kalamazoo, jointly, October 8, 15, 22, 29.
Flint, October 9, 16, 23, 30.
Grand Rapids, October 10, 17, 24, 31.
Lansing-Jackson, jointly, October 10, 17, 24, 31.
Manistee-Traverse City-Cadillac-Petoskey, jointly, October 11, 18, 25, November 1.
Mount Clemens, October 9, 16, 23, 30.
Saginaw, October 7, 14, 21, 28.

Included among the subjects for discussion are: the newborn period; the management of labor; development of hernia; significance of albuminuria; the psychoneuroses; laboratory procedures for office practice; nasal accessory sinus diseases in the practice of medicine, and the differential diagnosis of coma.

MINNESOTA

Changes in the Medical School.—New appointments to the University of Minnesota Medical School, Minneapolis, included the following:

Lemen J. Wells, Ph.D., assistant professor of anatomy, University of Missouri School of Medicine, Columbia, as associate professor of anatomy.
Dr. Charlotte M. Gast, formerly of New Bedford, Mass., assistant professor and assistant director of a course in medical technology.
Edwin S. Fletcher Jr., Ph.D., Chicago, and Robert B. Dean, Ph.D., Rochester, N. Y., instructors in the department of physiology.

The following promotions in the medical school have also been announced:

Halvor O. Halvorson, Ph.D., professor of bacteriology.
Dr. Raymond N. Bieter, professor of pharmacology.
Dr. William A. O'Brien, professor of preventive medicine and public health and director of postgraduate medical education.
Dr. Cecil J. Watson, professor of medicine and director of the division of internal medicine.
Dr. William T. Peyton, professor of surgery and director, division of neurosurgery.
George O. Burr, Ph.D., professor of plant physiology, has in addition been appointed director of the division of physiologic chemistry.
Dr. Arthur C. Kerkhof, clinical associate professor of medicine.
Dr. Starke Hathaway, clinical psychologist and associate professor of nervous and mental diseases.
Dr. James B. Carey, clinical associate professor of medicine.
Wallace D. Armstrong, Ph.D., associate professor of physiology and director of biological research in dentistry.

NEVADA

State Medical Meeting at Las Vegas.—The thirty-seventh annual meeting of the Nevada State Medical Association will be held at Las Vegas, October 10-12, with headquarters at the Elks Club. The scientific program will include the following speakers:

Dr. Victor S. Randolph, Phoenix, Ariz., Surgical Treatment of Pulmonary Tuberculosis.
Dr. Louis E. Viko, Salt Lake City, Etiology and Treatment of Hypertension.
Dr. William Whitfield Crane, Oakland, Calif., Surgical Treatment of Hypertension.
Dr. Verne C. Hunt, Los Angeles, Surgical Management of Carcinoma of the Colon.
Dr. Kenneth S. Davis, Los Angeles, Limitation and Evaluation of the X-Ray in the Diagnosis of Disease of the Gallbladder.
Dr. Gerald Brown O'Connor, San Francisco, Immediate Management of Surface Injuries.
Dr. Roland W. Stahr, Reno, Practical Points in Pediatrics.
Dr. John C. Wilson, Los Angeles, Present Status of Treatment of Fractures of the Neck of the Femur.
Dr. Hugh T. Jones, Los Angeles, Problems Encountered in the Orthopedic Care of the Knee Joint.
Dr. A. Elmer Belt, Los Angeles, Obstructive Uropathy in Childhood.

NEW HAMPSHIRE

Dr. Lancaster Goes to Dartmouth.—Dr. Walter B. Lancaster, for many years ophthalmic surgeon at the Boston City Hospital and the Massachusetts Eye and Ear Infirmary and a member of the faculty of Harvard Medical School, Boston, has been appointed chief of staff of the Dartmouth Eye Institute at Dartmouth College, Hanover, effective November 1. Dr. Lancaster is at present lecturer in ophthalmology on the staff of the Courses for Graduates at Harvard and consulting ophthalmic surgeon at the New England Hospital for Women and Children. He is a former president of the American Ophthalmological Society, the American Academy of Ophthalmology and Otolaryngology, the New England Ophthalmological Society and the American Board of Ophthalmology and in addition holds memberships in various other scientific societies. In 1928 he was chairman of the section on ophthalmology of the American Medical Association. He was also chairman of the section on ophthalmology of the National Conference on Nomenclature of Disease. During the World War he was head of the department of ophthalmology in the aeronautical research laboratories at Mitchel Field, New York. He graduated from Harvard Medical School in 1889.

NEW YORK

Million Volt X-Ray Unit at Buffalo.—Installation of a million volt x-ray therapy unit at the State Institute for the Study of Malignant Disease, Buffalo, was recently announced. A new three story wing has been built at the institute to accommodate the new unit, the offices of the director and other business offices and in addition it provides seventy-eight beds. Memorial Hospital, New York, and St. John's Hospital, Cleveland, have similar installations. Unlike previous x-ray equipment, this weighs only about 4,000 pounds and occupies only a single room.

Personal.—Dr. Harry Beckett Lang, Brentwood, has been appointed superintendent of the Buffalo State Hospital, succeeding Dr. John A. Pritchard, who has been appointed superintendent of the St. Lawrence State Hospital, Ogdensburg. —The Wayne County Medical Society at its August meeting honored Dr. John F. Myers, Sodus, for his long years of practice. Dr. Myers graduated from Columbia University College of Physicians and Surgeons and has been a member of the Wayne County society for fifty years. He received a set of travel books as a memento.

New York City

Railway Surgeons' Meeting.—The seventeenth annual meeting of the Association of Surgeons of the New York Central System was held at the Hotel Biltmore, September 24-26. Among the speakers were Drs. William W. Herrick, "Prognostic Factors in Circulatory Disease"; Charles Gordon Heyd, "A Consideration of Mortality in Gallbladder Disease," and Kristian G. Hansson, "Indications and Limitations of Physiotherapy in Railroad Injuries."

Hospital News.—The cornerstone of a new million dollar five-story dispensary building at Kings County Hospital, Brooklyn, was laid September 25. Speakers at the ceremony included Mayor La Guardia, Drs. Walter A. Coakley, president of the medical board, and Emanuel Giddings, medical superintendent. This will be the third of a series of ten dispensaries planned by the department of hospitals for different sections of the city to relieve overcrowding and inadequate service at the city's hospitals. It was reported by the hospital department that clinic visits at Kings County Hospital had increased from 163,638 in 1933 to 358,072 in 1939. New dispensaries were opened at Greenpoint Hospital, Brooklyn, in 1937 and on Welfare Island August 1 of this year.

OHIO

Society News.—Dr. Charles T. Way, Cleveland, addressed the Portage County Medical Society, Kent, September 5, on diseases of the kidney.—Dr. Gilson C. Engel, Philadelphia, addressed the Stark County Medical Society, Canton, September 11, on "Diagnosis of Intra-Abdominal Conditions."

Professor Waite Retires.—Frederick C. Waite, Ph.D., professor of histology and embryology at Western Reserve University School of Medicine since 1906 and in the dental school since 1915, has retired, having reached the age of 70. Dr. Waite took his undergraduate work and a master's degree at Western Reserve and his doctorate at Harvard University in 1898. He was appointed to the faculty of Western Reserve in 1901 as assistant professor of histology and embryology. The teaching of histology and embryology has now been made an integral part of the department of anatomy under the direc-

tion of Dr. Normand L. Hoerr. Samuel W. Chase, Ph.D., will continue the teaching of dental histology; he has had charge of this course for several years.

PENNSYLVANIA

Society News.—Dr. Garfield G. Duncan, Philadelphia, will present a "Practical Discussion of Diabetes for the General Practitioner" before the Dauphin County Medical Society, Harrisburg, October 8.

Philadelphia

Lectures at the College of Physicians.—The College of Physicians of Philadelphia opened its 1940-1941 series of scientific lectures, September 25, with an address by Dr. George W. Corner, Baltimore, on "Physiological Basis of Corpus Luteum Therapy," the Nathan Lewis Hatfield Lecture. Dr. John F. Fulton, New Haven, Conn., will deliver the S. Weir Mitchell Oration, November 6, on "Neurology and War," and Dr. Allen O. Whipple, New York, the Thomas Dent Mütter Lecture, December 4, on "Recent Studies in the Circulation of the Portal Bed and of the Spleen in Relation to Splenomegaly." Three lectures for the public have been arranged as follows:

- Dr. Chevalier Jackson, The Bronchoscope, November 15.
- Dr. Hubley R. Owen, Activities of the Department of Public Health, with Plans for the Future, Jan. 24, 1941.
- Dr. Richard A. Kern, Allergy and You, April 18, 1941.

Pittsburgh

Society News.—At the first fall meeting of the Allegheny County Medical Society, September 17, the speakers were Drs. Clifford Lee Wilmoth on "Abscess in and About the Liver"; Paul Gross, Franklin B. Cooper and Alfred F. Knoll, "Progress in Chemotherapy"; Louis H. Landay, "Treating the Allergic Patient," and William Shapera, "Dilantin Therapy in Certain Nervous Disorders."

TEXAS

Society News.—The fall meeting of the Texas Surgical Society will be held at the Rice Hotel, Houston, October 7-8, with Drs. Alfred W. Adson, Rochester, Minn., and Maxwell Harbin, Cleveland, as guest speakers.—Drs. James W. Ward and William P. Phillips, Greenville, addressed the Hunt-Rockwall-Rains County Medical Society, Greenville, September 10, on diseases of the eye and surgical treatment of acute diseases of the abdomen, respectively.—At a meeting of the Dallas County Medical Society, September 12, the speakers were Drs. Charles A. Ault Jr. on "Sarcoma of the Heart"; Elizabeth C. Williams, "Orthoptics as Related to General Medicine," and Donald G. Kilgore, "Coccydynia."

District Meeting in Texarkana.—The Northeast Texas District Medical Society will meet in Texarkana, October 8. Among the speakers will be:

- Dr. Joseph F. McVeigh, Fort Worth, Some Observations on Malaria and Its Treatment.
- Dr. Calvin R. Hannah, Dallas, Early Diagnosis of Pregnancy.
- Dr. Walter G. Reddick, Dallas, The Use of Sulfanilamide Derivatives in Acute Infections.
- Dr. Robert K. Womack, Longview, Practical Points in the Treatment of Gonorrhea in the Male.

Dr. Holman Taylor, Fort Worth, secretary of the State Medical Association of Texas, addressed a luncheon meeting on "Medical Preparedness" and Dr. Preston Hunt, Texarkana, president of the state association, also delivered an address.

VERMONT

State Medical Meeting in Rutland.—The one hundred and twenty-sixth annual meeting of the Vermont State Medical Society will be held at the Hotel Berwick, Rutland, October 10-11, under the presidency of Dr. Clarence F. Ball, Rutland. The following members of the faculty of the University of Rochester School of Medicine and Dentistry, Rochester, N. Y., will be the guest speakers:

- Dr. Charles M. Carpenter, Diagnosis and Control of Gonococcal Infections.
- Dr. Samuel W. Clausen, The Importance of Congenital Obstructions of the Intestines as a Cause of Vomiting in Infancy.
- Dr. William S. McCann, Practical Considerations of the Newer Physiologic Studies of Renal Disease.
- Dr. Stafford L. Warren, Survey of the Newer Aspects of Radiographic Diagnosis in Relation to the General Practitioner.
- Dr. Winfield W. Scott, Hematuria.
- Dr. Karl M. Wilson, The Use of X-Rays as a Diagnostic Aid in Obstetrics and Gynecology.
- Dr. William L. Bradford, Active and Passive Immunity Against the Common Infectious Diseases.
- Dr. William J. Merle Scott, Some Problems in Gastric Surgery.

Dr. Ball will deliver his presidential address on "Medical Vision"; Dr. Wilmer W. Angell, Randolph, the vice presidential address on "The Challenge of the Small Hospital," and

Dr. Hardy A. Kemp, dean and professor of bacteriology and preventive medicine, University of Vermont School of Medicine, Burlington, will speak on "Plans for Postgraduate Medical Education in Vermont."

A special program of ophthalmology and otolaryngology has been arranged with the following speakers:

- Dr. David Harold Walker, Boston, Practical Consideration of Ear Diseases.
- Dr. Deforest C. Jarvis, Barre, Twelve Varieties of the Common Cold.
- Dr. Walter B. Lancaster, Boston, Difficulties Encountered in Measuring Errors of Refraction.

There will also be a special meeting on pathology and radiology at which cases of cancer of the stomach will be presented, and Dr. Robert J. Stein, Newport, will read a paper on "Stromal and Systemic Changes in Carcinoma of the Breast."

The Vermont regional committee on fractures of the American College of Surgeons will present a symposium with the following speakers: Drs. Henry C. Marble, Boston, "Compound Fractures"; Andrew William Reggio, Boston, "Important Points in the Treatment of Ankle-Joint Fractures," and Otto J. Hermann, Boston, "Injuries to the Wrist and Foot."

WYOMING

Plague Infection.—According to *Public Health Reports*, plague infection has been proved in a pool of fifty-four fleas from twenty-two ground squirrels, in tissue from one ground squirrel, all from a locality from 8 to 10 miles north of Kendal Ranger Station, Sublette County, Wyo., and in a pool of eighteen fleas from fourteen ground squirrels taken from 12 to 15 miles north of the same station. The ground squirrels, all of the same species, *C. armatus*, were all shot the same day, August 6.

GENERAL

Regional Meeting of Obstetricians and Gynecologists.—The twelfth annual meeting of the Central Association of Obstetricians and Gynecologists will be held in Indianapolis, October 10-12, at the Hotel Lincoln, under the presidency of Dr. Jennings C. Litzberg, Minneapolis. Dr. Robert Otto Meyer, Minneapolis, will be the guest speaker on "Some Aspects of the Pathology of Hydatidiform Mole and Chorion-epithelioma." Among other speakers will be:

- Drs. Carl P. Huber and Jack C. Shrader, Indianapolis, Blood Prothrombin Levels in the Newborn (the clinical prize award essay).
- Dr. Harold Henderson, Detroit, The Relative Effect of General and Local Anesthesia on Asphyxia Neonatorum.
- Dr. John R. Wolff, Chicago, The Leukocyte Count in Labor.
- Drs. Harry L. Stewart Jr. and Jean P. Pratt, Detroit, Inhibition of Lactation.
- Dr. Phillips J. Carter, New Orleans, Conglutination Orificii Externi as a Factor in Delayed Labor.

Infantile Paralysis Fund Raised on President's Birthday.—The Committee for the Celebration of the President's Birthday reported to President Roosevelt, September 24, that the 1940 "Fight Infantile Paralysis Campaign" raised a net total of \$1,407,245.74. Of the total net proceeds, \$768,780.29 remained in the communities and chapters of the National Foundation for Infantile Paralysis throughout the country. The foundation received \$638,465.45 to carry on its work aimed toward eradicating and controlling the disease. The major part of the fund was raised by the parties and dances held on the President's birthday, January 30, and by sports events promoted by the "March of Sports." The "March of Dimes" raised a net total of \$250,205.07. California led the states in the net total raised, \$209,042.26; New York was second with \$199,258.38, and Pennsylvania third with \$86,644.67. The foundation's work is carried on through grants issued to universities, colleges and hospitals for research; it aids hospitals and institutions in the treatment of after-effects of the disease, distributing information on diagnosis and treatment and on the use of iron lungs, splints and braces. It sends doctors, nurses, epidemiologists, respirators and splints into towns and cities where they are needed. The chapters are working with health authorities and physicians in epidemic regions, using chapter funds to see that no case is neglected, according to the committee's report. The total number of cases this year exceeds the total for the same period last year, the principal outbreaks being in Washington, West Virginia, Indiana, Ohio, Michigan, Iowa, Kansas, Illinois, Kentucky and Montana. The number up to September 7, according to figures compiled by the U. S. Public Health Service, was 4,037, compared with 3,454 for the same period in 1939. Mr. Basil O'Connor, New York, is president of the National Foundation for Infantile Paralysis and Mr. Keith Morgan, New York, is national chairman of the Committee for the Celebration of the President's Birthday.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Aug. 24, 1940.

Examination of the Recruit's Heart

A committee appointed by the government, under the chairmanship of Lord Horder, to advise on the examination of recruits has presented recommendations on the methods of detecting "the effort syndrome" and diseases of the heart and arteries. The committee has submitted recommendations which amend and amplify the instructions existing for the guidance of medical boards. The committee was assisted in its work by the Cardiac Society of Great Britain and Ireland and by Sir Thomas Lewis and Dr. Paul Wood. "Effort syndrome" is defined as a condition in which the characteristic symptoms are nervousness, a feeling of exhaustion, left mammary discomfort, palpitation, giddiness and dyspnea on exertion. Many men break down during training or on active service with these symptoms. The great majority of them are neuropathic but in a small group the symptoms are attributable to chronic or temporary toxemia. The condition is rarely an expression of any disorder of the heart. A board may be able to foretell that certain recruits, by their appearance and demeanor and by evidence of nervous instability, are likely to break down in this way. Habitual avoidance of exertion in recreation is particularly suggestive. An exercise tolerance test affords little guidance in detecting potential sufferers from this syndrome but may be valuable in gaging the degree of emotional disturbance when the characteristic symptoms are already manifest.

The following revised form of tolerance test is now prescribed. 1. The pulse rate is taken for fifteen seconds with the man standing. 2. The man places one foot on a chair at least 15 inches high. He then raises himself until both feet are on the chair and the body is upright. He then lowers himself until one foot is on the floor. This is repeated twenty times in sixty seconds. The pulse is then taken for fifteen seconds. 3. The man stands still, and forty-five seconds later the pulse is taken for fifteen seconds. It should then be the same as or lower than the original rate. The persistence of any dyspnea or distress should be noted. If the original pulse rate is regained in sixty seconds and there is no dyspnea or distress he may be regarded as having good exercise tolerance. If the response is unsatisfactory the cause may be nervous instability or some cardiovascular defect and must be investigated. The test alone does not afford conclusive evidence of these conditions or of the man's unfitness for grade 1. The test may be rendered misleading by temporary factors such as a common cold or lack of fitness following prolonged sedentary work.

The heart should always be examined while the man is standing and also while he is lying on his left side; otherwise heart murmurs are difficult to detect. They should be listened for on both sides of the sternum and while the breath is held in full expiration. A man should be classed as in grade 4 whose heart shows signs of enlargement, aortic or mitral disease or congenital heart disease, even though well compensated and the existence of a fair response to the exercise tolerance test. A systolic murmur heard at the apex is not to be accepted alone as evidence of organic disease, but high grade exercise tolerance should be required and mitral or aortic disease carefully excluded. If the systolic bruit is slight and the only sign, the man may be accepted as of grade 1 provided he has good exercise tolerance. A systolic murmur at the base is common in health and may be disregarded when loudest in the pulmonary area, unless associated with other signs of congenital heart disease. If loudest in the aortic area, transmitted upward and accompanied by a thrill, it indicates aortic stenosis.

If the cardiac impulse is felt beyond the midclavicular line, the heart is enlarged provided the displacement is not due to scoliosis or to pulmonary disease. The commonest causes of enlargement are aortic and mitral disease; less common causes are hypertension and congenital heart disease. Abnormal rhythm is not necessarily evidence of organic disease. Before grading, the previous history (occupation, athletic habit and other activities) must be reviewed as well as the exercise tolerance test. Tachycardia is most often an expression of nervousness, but if paroxysmal requires a low grading. Hyperthyroidism should be excluded. Cases of arrhythmia and tachycardia of doubtful nature should be referred to a consultant. In all men over 40 and in any case of cardiac enlargement or of suspected arteriosclerosis the blood pressure should be taken.

The Medical Women's Federation and the Prevention of Venereal Disease

The Medical Women's Federation has taken a strong interest in the problem of venereal disease. It has issued a statement pointing out that the large numbers of men and women in the fighting forces render the prevention of venereal disease important. The most effective way would be welfare services available to all. These would provide not only ample arrangements for healthy recreation but also education and advice in matters of health. The work of welfare officers has already proved valuable in maintaining good morale, but the staff should be augmented by suitably qualified men and women, and individual private hospitality should be welcomed in association with the official organization. Provision of this kind is of primary importance in the prevention of venereal disease.

The federation emphasizes the importance of sex teaching with the object of developing a social conscience in men and women. Education in sex hygiene should be given to all members of the fighting forces, both men and women. For women this should be given by medical women who have special experience in social hygiene. Members of the women's forces who contract venereal disease should not necessarily be dismissed but given adequate and sympathetic treatment. They should have facilities similar to those of men and have access to medical women. The federation emphasizes its belief that *maisons tolérées* are a danger to health and likely to increase venereal disease. Further, although some individual infection may be prevented by the use of "prophylactic packets," their routine distribution, by implying official sanction of illicit intercourse, tends to increase promiscuity and the incidence of venereal disease. Welfare facilities, education and treatment should also be fully available for munition workers, especially those working for long hours.

ITALY

(From Our Regular Correspondent)

Aug. 3, 1940.

Medical Aid at the Battle Front

• Prof. Filippo Ferraro, who was chief of sanitation of a division of volunteers in the Spanish civil war, recently discussed in Genoa modern medical units in mobile warfare. The new ideas in military tactics and in the use of weapons necessarily have changed also the operation of the divisional medical service. Medical units in war can no longer be considered relatively stationary; on the contrary, they must meet the needs of rapid shifts of position, intensified by aerial warfare, and must follow troops in action to within the nearest distance possible. They must maintain medical equipment at all times at the highest efficiency. Basing his observations on the statistics gathered during the battles of Guadalajara and Santander, regarded by military experts as two of the most typical modern battles, the speaker pointed out that the proportion of divisional losses sustained was, on the average, 8 per cent as

compared with a 20 per cent loss recorded for the war of 1914-1918. The index for seriously wounded was about 9.5 per cent. In comparison with Italian statistics for the World War indicating 39.1 per cent as wounded by small arms and 19.5 per cent by artillery, present statistics indicate 69.3 per cent as wounded by small arms and 19.5 per cent by artillery. Seven and eight tenths per cent were wounded by bombs discharged from airplanes and 7.8 per cent by explosion of mines. As to the site of traumatic lesions, important from the point of view both of medical technic and of the handling of the wounded in the field, there was a relative increase in wounds of the lower extremities, compared with the statistics for the war of 1914-1918. The percentage for wounds of the abdomen and thorax remained practically unchanged. Mortality on the battlefield amounted to 15.7 per cent. This is in accord with the general average accepted by military medical statistics. Deaths due to freezing and gassing were few. Military physicians, he said, were not all in accord in regard to specialized surgical service. Experience had taught him that the principal function of what is referred to as the "surgical nucleus" was early intervention for all wounded promising recovery. In fact, Ferraro's statistics indicated that the shorter the distance of the "surgical nucleus" from the battle line the lower the mortality rate among the wounded and even among those operated on. Since establishing a position and getting ready required time, he favored the idea that the "nucleus" be attached either to a less advanced unit of the medical service or to an advanced field hospital. However, a more practical suggestion would be to divide the "nucleus" into two parts so as to guarantee continuity of service on the relay plan. The divisional medical staff might also request to have placed at its disposal reserve groups of surgeons to meet the need of excessive demands occurring on the same day.

Changes in the Volume of Circulating Blood

Professor Bertola discussed before the society of physicians and surgeons of Pavia the modifications which the volume of circulating blood may undergo in response to certain factors. Modifications may be caused by changes in the position of the subject during the action of certain drugs on the vegetative nervous system. In the change from a recumbent to a standing position, increases as well as decreases of the circulating blood were observed. The increases were accompanied on the whole by a lowering of the arterial blood pressure, whereas an increase in pressor levels accompanied the diminution of the circulating blood.

During the action of atropine, in general, hypovolemia prevailed in subjects in the standing position combined with hypotensive reactions and a diminution of pulse frequency. The opposite behavior was noted during the action of pilocarpine. Ergotamine showed a behavior analogous to that induced by atropine, whereas epinephrine generally increased the circulation of the blood when subjects stood and showed an increase in the pressor levels and pulse frequency. In short, substances which stimulated the vagus and the sympathetic nerve produced predominantly hypervolemia in the standing position, whereas those with inhibitory action showed a contrary behavior.

Investigations into the modifications of the volume of circulating blood and of other factors during digestion both in normal subjects and in patients with gastric disorders showed regularly an increase in the volume of circulating blood after the administration of carbohydrates, proteins, fats, salts or a mixed diet. In patients with ulcers, on the contrary, a decrease in the volume of the circulating blood was regularly observed. These results may be explained by the fact, he said, that certain organs may be regarded as filled with blood owing to the regulator function of the vegetative nervous system.

Studies of the regulatory effect of the carotid sinus on the behavior of the circulating blood when the subject changed

from a recumbent position to one with the head down prevailingly indicated in normal and hypotensive persons a decrease in the circulating blood, which at times was considerable, together with an increase in the rate of circulation. In hypertensive persons, on the other hand, there were pronounced variations in the volume of the circulating blood, generally in the direction of increases. Present knowledge cannot satisfactorily explain the factors that produce these differences. However, Ferraro stressed certain facts such as the opposite behavior of pulse reaction, of arterial pressure and of the volume of circulating blood, which is typical for hypertensive persons and rare in normal and hypotensive subjects. The importance of the action of organs which act as depositories of blood and which are prevailingly regulated by the vagus and the sympathetic nerve is not overlooked. Yet the possibility is not excluded that reflex vasomotor modifications under the influence of the vasoreceptor zones may interfere with the regulation of the circulating blood.

Deaths

Prof. Luigi Sestini, physician general of the navy and a war invalid, died at Spezia. He was highly esteemed. Among the positions of responsibility held by him was the directorship of the School of Health in Naples. His special interest lay in promoting health in the navy by the institution of sanitary improvements on war vessels and by combating tuberculosis.

Marriages

WILLIAM KENNETH MASSEY, Ashcroft, B. C., Canada, to Miss Corinne Kearfoot Saunders of Winnipeg, Man., recently.

BRIAN DESMOND BEST, Winnipeg, Man., Canada, to Miss Jean Margaret Prior of Portage La Prairie, June 29.

JAMES ROY BREED, Wappingers Falls, N. Y., to Miss Jocelyn Harrington of Poughkeepsie, September 7.

JAMES PORTER LEATHERS, Nashville, Tenn., to Miss Katheryne Bowden McClain of Lebanon in August.

WILL HARDEE LASSITER JR., Selma, N. C., to Miss Kathleen Anderson of Winston Salem in August.

EMANUEL BARNETT HECHT, Ancon, Canal Zone, to Miss Adele Weinstock of New York, July 25.

ROBERT T. McMAHON, Albany, Calif., to Miss June Huml of Oakland, July 13, in Carson City, Nev.

EILIF CARL HANSSEN, New York, to Miss Carroll Ellicott Henderson at Los Angeles, June 21.

CLAUDE FREDERICK OTTEN, Morristown, N. J., to Miss Lois Heuse of Dallas, Texas, August 17.

ROBERT WOOLFORD, Hamilton, Ohio, to Miss Mary Margaret Kilgore in Columbus, September 1.

WILLIAM B. LYBROOK, Young America, Ind., to Miss Betty Lou Etnire of Logansport, June 25.

EDMOND CHADWICK CAMPBELL, Morganza, La., to Miss Edna Peresich at Monroe, August 4.

LOYD E. ROSENBAUM, Anderson, Ind., to Miss Doris Nussbaum of St. Louis, August 5.

MARVIN R. DAVIS, Letts, Ind., to Miss Martha Louise Banister of Columbus, July 6.

RICHARD L. VARCO, Minneapolis, to Miss Louise Miller at Pasadena, Calif., June 4.

WILLIAM B. ARMSTRONG to Miss Henrietta Collier, both of Atlanta, Ga., August 1.

STANLEY LLOYD TEITELMAN to Miss Bobette Wilson, both of Chicago, August 31.

JOSEPH RAIDER, Mundelein, Ill., to Miss Beatrice Goldsmith of Chicago, August 22.

DAVID F. STONE to Miss Katherine Charlotte Weiss, both of Indianapolis, June 28.

EMIL A. HOFER, Iroquois, S. D., to Miss Ann Hodges of De Smet, June 27.

LAWRENCE M. DUNN to Miss Gertrude Grbac, both of Depue, Ill., August 10.

Deaths

Grant Phileo Curtis ☉ Union City, N. J.; Jefferson Medical College of Philadelphia, 1906; health officer; served during the World War; for many years attending physician at the Hudson County Penitentiary; consulting phthisiologist at Margaret Hague Hospital, Jersey City; consultant at Hudson County Tuberculosis Hospital, Jersey City; aged 55; died, August 28, in the Hospital for Ruptured and Crippled, New York, of acute pancreatitis.

Lewis Leonidas Rogers Jr., ☉ Wilkes-Barre, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1913; member of the Radiological Society of North America; past president of the Luzerne County Medical Society; served during the World War; was a member of the school board of Kingston; aged 50; on the staffs of the Mercy Hospital and the Wilkes-Barre General Hospital, where he died, August 11, of arterio-vascular nephrosclerosis.

Guy Sexton Carpenter ☉ Waverly, N. Y.; Cornell University Medical College, New York, 1899; past president of the Tioga County Medical Society; health officer of the village of Waverly and the town of Barton; aged 66; on the staff of the Tioga County General Hospital, where he died, August 28, of cerebral hemorrhage.

George Edward Harhen, Caldwell, N. J.; Long Island College Hospital, Brooklyn, 1912; member of the Medical Society of New Jersey; at one time physician in charge of the Newark City Sanatorium, Verona; aged 53; on the staff of St. Vincent's Hospital, Montclair, where he died, August 24, of cerebral hemorrhage.

Joseph Whitman Sherer ☉ Kansas City, Mo.; State University of Iowa College of Medicine, Iowa City, 1894; University of Pennsylvania Department of Medicine, Philadelphia, 1895; fellow of the American College of Surgeons; aged 70; died, August 17, at Excelsior Springs, of injuries received in an automobile accident.

Charles Dana Hunter, Tacoma, Wash.; Rush Medical College, Chicago, 1905; member of the Washington State Medical Association and the North Pacific Surgical Association; fellow of the American College of Surgeons; served during the World War; aged 60; died, August 5, of coronary thrombosis.

Joseph Archibald Robertson ☉ Dallas, Texas; University of Texas School of Medicine, Galveston, 1898; fellow of the American College of Surgeons; attending surgeon, St. Paul's, Dallas Methodist and Baylor hospitals; consulting surgeon to the Parkland Hospital; aged 65; died, August 18, of coronary occlusion.

Oscar Ewing Townsend, Elyria, Ohio; Eclectic Medical College, Cincinnati, 1911; Medical Department of the University of Cincinnati, 1912; member of the Ohio State Medical Association; served during the World War; on the staff of the Elyria Memorial Hospital; aged 54; died, August 17, of heart disease.

James Monroe Peterson, Spruce Pine, N. C.; Tennessee Medical College, Knoxville, 1902; veteran of the Spanish-American and World wars; at one time postmaster; formerly county superintendent of public instruction; aged 68; died, August 19, in Johnson City, Tenn., of carcinoma of the lung.

Cornelius Wilson Lane ☉ Castle Rock, Wash.; Hahnemann Medical College and Hospital, Chicago, 1905; at one time health officer of Del Norte County, Calif.; for many years a member of the United States Indian Service; aged 56; died, August 13, at Longview, Wash., of coronary thrombosis.

Thomas Scholz ☉ New York; Columbia University College of Physicians and Surgeons, New York, 1916; aged 58; on the staffs of St. Joseph's Hospital, New York Foundling Hospital and St. Francis Hospital, where he died, August 28, of diabetes mellitus and chronic nephritis.

William Baird Andrews ☉ Kent, Ohio; Homeopathic Hospital College, Cleveland, 1890; for many years member of the county board of health, president of the board of health of Kent and member of the board of education; aged 73; died, August 28, of angina pectoris.

James Tertius Norton, Kent, Ohio; Western Reserve University Medical Department, Cleveland, 1910; served during the World War; formerly on the staff of the Babies Hospital, Cleveland; aged 56; died, August 27, of coronary thrombosis and cerebral embolus.

John David Gable, Lake City, Fla.; University of Nashville (Tenn.) Medical Department, 1908; served during the World War; aged 67; on the staff of the Veterans Administration Facility, where he died, August 13, of arteriosclerosis and coronary heart disease.

Edward Lowell Saylor ☉ Akron, Ohio; University of Kansas School of Medicine, Kansas City, 1925; member of the American Society of Clinical Pathologists; aged 39; on the staff of the City Hospital, where he died, August 10, of a self-inflicted bullet wound.

Edward King Tyler, Muscatine, Iowa; State University of Iowa College of Medicine, Iowa City, 1882; member of the Iowa State Medical Society; aged 81; on the staff of the Benjamin Hershey Memorial Hospital, where he died, August 3, of chronic bronchitis.

Willard McKenzie Burleson, Richmond, Va.; Medical College of Virginia, Richmond, 1937; member of the Michigan State Medical Society; resident, Medical College of Virginia, Hospital Division; aged 28; was killed, August 31, in an airplane accident.

Nils Olof Byland ☉ Battle Creek, Mich.; University of Michigan Medical School, Ann Arbor, 1922; served during the World War; for many years on the staff of the Battle Creek Sanitarium; aged 59; died, August 29, of heart disease.

John William Leo Brennan, St. Louis; St. Louis College of Physicians and Surgeons, 1906; aged 58; died, August 28, in the Veterans Administration Facility, Jefferson Barracks, of hypertensive and coronary arteriosclerotic heart disease.

Ernest Gollub, Staten Island, N. Y.; Jefferson Medical College of Philadelphia, 1937; on the staff of the Sea View Hospital; aged 28; died, August 27, in the Post-Graduate Hospital, New York, of mastoiditis and brain abscess.

Theodore Perry Bishop, Grand Rapids, Mich.; University of Michigan Medical School, Ann Arbor, 1921; member of the Michigan State Medical Society; aged 51; died, August 29, in the Butterworth Hospital of tumor of the right adrenal.

Samuel Albert Jones, Sheffield, Vt.; University of Vermont College of Medicine, Burlington, 1883; member of the Vermont State Medical Society; aged 83; died, August 11, of cerebral hemorrhage and arteriosclerosis.

Rolla Camden, Parkersburg, W. Va.; Jefferson Medical College of Philadelphia, 1897; on the staff of the Camden-Clark Memorial Hospital and St. Joseph's Hospital; aged 67; died, August 22, of chronic nephritis.

Henry Gray Morris ☉ Jamestown, N. Y.; Cornell University Medical College, New York, 1921; member of the Radiological Society of North America, Inc.; aged 44; died, August 20, of cerebral hemorrhage.

John Ralph Coryell, Kansas City, Mo.; University of Virginia Department of Medicine, Charlottesville, 1909; aged 54; died, July 9, in St. Luke's Hospital of ruptured esophageal varices and cirrhosis of the liver.

Robert James McDonald, Doylestown, Wis.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1901; aged 69; died, August 17, in Columbus of pernicious anemia.

Frank James Pherson, Manchester, N. H.; Jefferson Medical College of Philadelphia, 1908; member of the New Hampshire Medical Society; aged 59; died, August 27, in Boston of heart disease.

Paul Martin Lennox, Colorado Springs, Colo.; Columbia University College of Physicians and Surgeons, New York, 1903; aged 59; died, August 28, in the Beth-El General Hospital of pneumonia.

Austin Emery St. Clair, Framingham, Mass.; University of Vermont College of Medicine, Burlington, 1893; member of the Massachusetts Medical Society; aged 75; died, August 7, of arteriosclerosis.

John Wesley Barkley, Ligonier, Pa.; Jefferson Medical College, Philadelphia, 1897; member of the Medical Society of the State of Pennsylvania; aged 72; died, August 29, of cardiovascular disease.

Thomas Blair, Ann Arbor, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1892; aged 79; died, August 28, in the University Hospital of perforated duodenal ulcer.

J. Thomas O'Toole, Oklahoma City; Independent Medical College, Chicago, 1898; aged 79; died, July 7, in St. Anthony Hospital of arteriosclerosis and heart disease.

Correspondence

CARBOHYDRATES AND HEADACHE

To the Editor:—With reference to the relationship between the ingestion of carbohydrates and the development of headaches, you make the statement (Queries and Minor Notes, THE JOURNAL, July 6, p. 75) that Wagner-Jauregg and Porges purported to show that a low carbohydrate diet is beneficial in cases of migraine. This suggestion was first made by me (A New Approach to Dietetic Therapy, Boston, R. G. Badger, 1933; A New Aspect of Migraine and Certain Related Conditions, *Am. J. Digest. Dis. & Nutrition* 1:359 [Aug.] 1934, and so on), as admitted by Wagner-Jauregg in a personal communication. I offered the theory that low carbohydrate diet is effective in the prevention of migraine by preventing the development of cerebral edema. A recent publication (Migränebehandlung mit kohlehydratarmer Diät, *Klin. Wchschr.* 18:390 [March 18] 1939) summarizes my observations and theories and contains the pertinent bibliography.

EUGENE FOLDES, M.D., New York.

BUNDLES FOR BRITAIN

To the Editor:—The situation in England is one of intense suffering. Surgical instruments and equipment are urgently needed NOW. Will you please help me to help the doctors and surgeons at home to relieve this suffering by publishing this letter together with the enclosed list of instruments? This list has just been flown across to me by clipper, from a source of highest authority in London.

Instruments Urgently Needed in British First Aid Stations

Airways, endotracheal	Gorget, lithotomy	Speculums, ear, eye, nasal, rectal
Apparatus, anesthetic (portable)	Gouges, bone	Sphygmomanometer, aneroïd
Apparatus, intravenous	Headbands, metal, with mirrors	Stands for irrigators
Aspirators	Hemostats, all types	Sterilizers, all
Autoclave	Holders, needle	Stethoscopes
Basins	Inhalers, chloroform	Stools, anesthetists', with revolving top
Cabinets, instrument	Knives, all types	Stools, foot
Cannula, brain exploring	Lamps, operating, emergency, complete	Syringes, all sizes, with needles
Catheters	Mallets, metal, lead filled	Tables, instrument
Chisels, bone	Mirrors, laryngeal	Tables, operating
Clamps, bone plating	Pharyngoscope with battery in handle	Trocars
Clamps, intestinal	Plates, bone	Tubes, tracheotomy
Clips, towel	Pliers, side cutting, 6 inch	Wax, bone, sterile
Curets, mastoid	Probes, all types	Buckets
Diagnostic sets	Retractors, all types	Clippers, hair
Depressors, tongue	Rings, laparotomy	Cups, medicine
Directors, grooved, with myrtle leaf	Saws, all types	Jugs, graduated
Drill, bone	Scissors, all types	Measures, glass, graduated
Drills, cranial	Screws, bone plating	Pans, bed, enamel
Elevators	Shears	Pitchers, 3 quart
Forceps, artery, all types	Snare	Stoves, petrol or paraffin, table model
Forceps, bone, rongeurs	Sounds, metal	Tables, bedside
Gags, mouth, Denhart	Spatula	Urinals, E. I.

I feel this is the quickest way to appeal to all doctors in the hope that they will read this and send their surplus instruments to me at the address below. All contributions will be sent to England at once, where they will help to save many lives that may otherwise be lost.

RAFAELLE LEINSTER,
The Duchess of Leinster,
Surgical Supplies,
745 Fifth Avenue,
New York.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

FORMALDEHYDE STERILIZATION OF FOOTWEAR

To the Editor:—Please give detailed directions for fumigating shoes with formaldehyde.
M.D., Illinois.

ANSWER.—Shoes, slippers and other footwear should be sponged each week with 10 per cent solution of formaldehyde or they can be placed in a closed box together with a dish of solution of formaldehyde for twenty-four hours. After each sponging or exposure to the formaldehyde fumes, articles should not be worn before airing for at least twenty-four hours. Failure to carry out the last precaution may result in a dermatitis from the formaldehyde vapor. Henderson and also Ayres, Anderson and Youngblood have found formaldehyde vapor an effective means of fumigation.

Cotton socks worn by patients with tinea pedis should be boiled for ten minutes or immersed for half an hour in a 1:1,000 solution of mercury bichloride. They may then be washed with soap and water or sent to the laundry. Woolen and silk stockings may be ruined by boiling, but the use of formaldehyde vapor in a box will be found effective.

References:

- Henderson, Yandell: Fungous Infection of the Feet, *Arch. Dermat. & Syph.* 26:710 (Oct.) 1932.
Ayres, Samuel, Jr.; Anderson, N. P., and Youngblood, Esther M.: Fumigation as an Aid in the Control of Superficial Fungous Infections, *ibid.* 24:283 (Aug.) 1931.

SHIPPING BLOOD FOR AGGLUTINATION TESTS

To the Editor:—What is the opinion of hematologists on the cross-matching value of both red blood cells in a 2 per cent sodium citrate solution of physiologic solution of sodium chloride and blood serum which has remained at temperatures such as might be encountered in the ordinary methods of transportation? If such cells and serum had remained for twenty-four hours at a temperature ranging from 90 to 100 F. would these both still be suitable in cross-matching prior to transfusions?

M.D., Oklahoma.

ANSWER.—Red blood cells in suspension in sodium citrate solution or physiologic solution of sodium chloride together with the blood serum, when shipped through the mails, are not suitable for grouping or cross-matching tests for transfusion. The best method to ship blood is to collect the blood as for a Wassermann test and send the clotted blood sample by air mail, special delivery, if the destination is any considerable distance away. The package should be marked "Avoid excessive heat and cold." The blood should be taken with sterile precautions, placed in sterile tubes and hermetically sealed with a sterile rubber stopper or in the flame. Under these conditions twenty-four hours at from 90 to 100 F. probably will not spoil the sample, there being no bacterial contamination. Blood cells in dilute suspension quickly lose their sensitivity for agglutination, even if sterile, whereas in the clotted form this is retained for much longer periods. In addition, dilute blood suspensions, especially when infected with certain bacteria, may become "panagglutinable" and are also more apt to agglutinate spontaneously or hemolyse.

As far as the serum is concerned, agglutinins will deteriorate gradually at 90 to 100 F., though the common iso-agglutinins α and β should be demonstrable for at least a week and usually much longer under such conditions, provided the sample is not infected. Not infrequently, however, the iso-agglutinins are of low titer and such will deteriorate rapidly. Moreover, irregular agglutinins, which are almost invariably of low potency, despite the fact that they can give rise to severe hemolytic reactions even though the groups of patient and donor are identical (Wiener, A. S., and Peters, H. R.: Hemolytic Reactions Following Transfusions of Blood of the Homologous Group, with Three Cases in Which the Same Agglutininogen was Responsible, *Ann. Int. Med.* 13:2306 [June] 1940) will probably not be demonstrable under these conditions.

Accordingly the best method, as stated, is to ship the blood in clotted form. The individual receiving the sample can

separate the serum by centrifuging. Blood suspensions can be prepared by shaking up the clot in saline solution; the coarser particles are allowed to sediment and the supernatant smooth emulsion is transferred to a clean tube for use in the grouping tests.

FUNGUS INFECTION OF NAILS

To the Editor:—I have recently seen two cases of fungous infection of the finger nails. I have not yet received reports of the cultures which have been made. Any information you may have regarding this condition, particularly as regards effective treatment, will be appreciated.

M.D., Kentucky.

ANSWER.—Infection of the nails by fungi was formerly considered a rarity, but the experience of all dermatologists contradicts this. Whether the infecting organism is one of the yeastlike fungi or belongs to the hyphomycetes the symptoms are apt to be much the same, though the yeastlike organisms are more liable to cause acute inflammation, involvement of the nail folds and pus formation. Oláh (Neuere Beiträge zur Klinik u. Therapie der Mykogenen Onychien u. Paronychien, *Dermat. Wchnschr.* 103:1189 [Aug. 29] 1936) has emphasized the fact that stippling of the nail, Beau's punctae, as seen in psoriasis, is sometimes one of the signs of such infection. In both infections, thickening of the nail, discoloration, fissuring, scaling, brittleness, partial or complete separation from the nail bed, thinning or even almost complete destruction may be seen. Sulzberger and Lewis (Leukonychia Tricophytina, *M. Rec.* 146:305 [Oct. 6] 1937) have reported white spots which consist of masses of spores and mycelium in the lower part of the nail next the nail bed, caused by *Tricophyton gypsum*.

The treatment of these cases is one of the difficult problems of dermatology. In cases in which the yeastlike infection is brought on by constant immersion of the hands in dish water or in fruit juices, as described by Kingery and Thienes (Mycotic Paronychia and Dermatitis, *Arch. Dermat. & Syph.* 11:186 [Feb.] 1925) abstention from the work and mild applications, such as a 10 per cent solution of sodium thiosulfate in water may suffice; but most cases require more energetic measures. Puncture of the nail, if pus is seen beneath it, and wet dressings of the thiosulfate solution, painting with 5 per cent watery solution of gentian violet, or the use of mercurials such as ammoniated mercury ointment may succeed in producing cure. Iodides by mouth or sodium iodide intravenously, with tincture of iodine applied locally, is successful in some cases. In all chronic forms of either yeastlike or hyphomycetic infection the nail must first be thinned, either by direct scraping or by filing, or by first softening it by soaking it in soap solution for twenty-four hours or the application of a strong potassium hydroxide solution for a short time (45 per cent solution for fifteen minutes). The nail folds should be protected by petrolatum. This thinning process must be repeated once or twice a week. After this thinning has been carried as far as practical, three methods are open to the physician: chemical attack, actinic action or surgical ablation of the nail.

Chemical methods are many besides those already mentioned. Stelwagon applied a 0.2 to 1 per cent solution of mercury bichloride in water followed by ammoniated mercury ointment. Harrison used a 50 per cent solution of potassium hydroxide in water, to eight parts of which he added one part of potassium iodide, for softening. This he allowed to act for fifteen minutes. He then applied a 1 per cent aqueous solution of mercury bichloride for twenty-four hours. Glaze used a saturated aqueous solution of sodium thiosulfate; others apply diluted acetic acid and then mop on a 6 to 10 per cent solution of the thiosulfate. Dubreuilh advocated the application of equal parts of pyrogallol and olive oil. Sutton advocates the use of 10 per cent silver nitrate solution in alcohol. It must be a somewhat diluted alcohol to dissolve this amount of silver nitrate. Cleveland White uses a strong Whitfield ointment, 12 per cent of salicylic acid and 24 per cent of benzoic acid. Way uses 1 per cent malachite green, 2 per cent phenol, 5 per cent salicylic acid and 24 per cent alcohol in xylene, painted on twice daily. Walker dresses the nail with Fehling's solution for two days, then removes the nail and applies a dressing of 2 per cent copper sulfate in water.

Combining chemical with actinic action is the method of Paulina Gomez-Vega, who determined by a careful research that a solution of mercurochrome 1 part to 10,000 sensitizes the organisms to the action of sunlight. Her results in a small

number of cases were encouraging. (Effect of Irradiation and Irradiation plus Sensitization on Yeastlike Fungi and Related Organisms, *Arch. Dermat. & Syph.* 34:961 [Dec.] 1936).

MacKee (X-Rays and Radium in the Treatment of Diseases of the Skin, ed. 3, Philadelphia, Lea & Febiger, 1938, p. 480) uses hot soap suds for softening the nail; soaking it for an hour or two, then scraping it as thin as possible. For two weeks preceding the treatment, during the period of irradiation or for two weeks after the series of treatments has ended, he does not allow the use of any strong chemicals. While he thinks that a 1:5,000 solution of mercury bichloride, a 3 per cent ammoniated mercury ointment or 3 per cent precipitated sulfur ointment would be permissible, he does not allow his patients to use anything stronger than soap and water.

Because of the absorption of rays by the nail plate in spite of the reduction in its thickness, some filtration of the x-rays is called for and a larger dose of rays is advisable over the nail than could be used safely on the skin. In case of combined onychia and paronychia both nail and nail fold may be first irradiated with fractional doses, then the nail fold covered by lead and an additional dose given the nail itself. He permits several nails to be treated at one exposure, both thumb nails or big toe nails, for instance. The prognosis seems better for irradiation than for chemical treatment. Relapses are not common.

Most dermatologists do not favor surgical ablation of the nail because of the frequency with which the new nail is infected.

EXTERNAL HEMORRHOIDS AND PECTINOSIS

To the Editor:—What is the treatment of varicosities of the anal margin? Can four or five varicose veins, first degree in nature, bring on symptoms severe enough to make the patient constantly uncomfortable? She complains of burning in the rectum with pains radiating to the lumbar regions and thighs. The patient, 62 years old, has a history of a number of injections for hemorrhoids. The original symptoms of prolusion and bleeding cleared up, but the pain and burning described developed and persisted for about nine months without relief. A proctologist was consulted and a diagnosis of chronic proctitis was made, due to injections made in the presence of infection. Fissure, fistula and the like were ruled out. The urine was normal. The proctoscopic examination disclosed induration throughout the wall of the rectum. This does not respond to treatment. Is it to be considered that injection of hemorrhoids may have resulted in the dilatation of the veins around the anus? Would it be safe to inject these veins with sodium morrhuate?

M.D., New York.

ANSWER.—External hemorrhoids are usually unsuitable for injection treatment. In the case described it would be important to determine whether or not the varicosities are distal to the pectinate line, as injections should never be made distal to it. A pathologic thickening of fibrous tissue as a result of congestion and infection was described by W. Ernest Miles in 1918 as the pecten band and the condition was named pectenosis. It is conceivable that the injections were made into so-called mixed varicosities, obliterating the internal hemorrhoids and leaving the dilatations intact below the anal membrane or the perianal skin. The anal canal and the region of the pectinate line are extremely sensitive owing to the rich supply of sensory nerve endings. In the case mentioned chronic cryptitis or papillitis should be considered. The management of these calls for an expert proctologist.

LIPOCAIC AND LIPOLYSIN

To the Editor:—In reference to the article by Dr. Dragstedt in The Journal, January 6, can you tell me if the substance Dragstedt describes is the same as Dr. J. B. Wolfe's lipolysin? M.D., New Jersey.

ANSWER.—Lipocaic is the name suggested by Dragstedt and his associates for a substance present in extracts of pancreas which they believe represents a specific hormone concerned in the utilization and transport of body fat. The beneficial effects of the oral administration of fresh pancreas in prolonging the lives of depancreatized dogs treated with insulin and in preventing the usual fatty infiltration of the liver which occurs in these animals is due to the presence of this hormone and not to the amount of choline or lecithin present in the pancreas.

They have suggested the following criteria as indicating the presence of lipocaic in various pancreas extracts: A minimum of three normal dogs should be completely depancreatized and placed on a diet of protein, carbohydrate and liberal amounts of fat and given sufficient insulin to limit the glycosuria to less than 10 Gm. a day. The presence of lipocaic deficiency in these animals is indicated after five to six weeks by a decrease in the concentration of fat in the blood to approximately half of the

normal concentration, decrease in insulin requirement, decrease in dextrose excretion, loss of weight and appetite, impairment of liver function as evidenced by the bromsulphalein test and the finding of fatty accumulation in the liver as determined by laparotomy and biopsy. Lipocaic may be concluded to be present in a pancreas extract which when given to such animals restores the concentration of blood fat to the normal amount, restores the insulin requirement to the amount required immediately after operation, restores the average dextrose excretion, corrects the abnormality of liver function and removes the fatty accumulation in the liver, as determined by a second laparotomy and biopsy.

Wolffe has not presented this sort of evidence indicating the presence of lipocaic in his pancreas extract.

References:

- Dragstedt, L. R.; Vermeulen, Cornelius; Goodpasture, W. C.; Donovan, P. B., and Geer, W. A.: Lipocaic and Fatty Infiltration of the Liver in Pancreatic Diabetes, *Arch. Int. Med.* 64:1017 (Nov.) 1939.
Dragstedt, L. R.: The Present Status of Lipocaic, *THE JOURNAL*, Jan. 6, 1940, p. 29.

UREA INJECTIONS FOR WARTS

To the Editor:—It has come to my attention that a solution of urea has been used for injection beneath the base of ordinary warts on the hand which are incurable by any other treatment. Are there any references on the subject?

J. Dwight Wilson, M.D., Berkeley, Calif.

ANSWER.—The only reference found to this form of treatment is "The Use of Urea (Carbamide) in the Treatment of Warts (MacKay, E. M.: *Arch. Dermat. & Syph.* 41:736 [April] 1940). Based on the virucidal power of strong solutions of urea and their harmlessness in contact with human tissues, it was thought that the drug might be useful in the treatment of warts. Experimentation was begun by the inoculation into monkey skin of an extract of human warts in physiologic solution of sodium chloride. These injections were frequently followed by the growth of warts. An extract of warts made with a solution of urea did not cause warts in monkeys. With this as a basis, the treatment of human warts was undertaken, a 50 per cent sterile aqueous solution of urea being used. From 0.1 to 0.3 cc. of this solution was injected into the base of each wart, but not deeply. This caused pain, moderate in most instances.

The first six patients were all cured by the first injection. Of sixteen others treated by other physicians, eight were cured by one injection and several yielded to the second injection, but some of the patients resisted the treatment entirely. The cures resulted in from five to eighteen days after the injection. The author considers multiple warts more resistant than single ones. He did not treat plantar warts.

After beginning his investigation, the author discovered the report of Pietzsch in 1927, who used a method almost identical with MacKay's in the treatment of warts in horses. No reference to the use of his method in man was found.

ALCOHOL, ETHER AND ACETONE AS DISINFECTANTS

To the Editor:—What are the relative values of the following three agents when used as skin or wound antiseptics: 70 per cent alcohol by weight, ether or acetone? In this connection it is noted that acetone is often used as a base for many of the dye antiseptic solutions. I am unable to find any definite information as to the relative value of these three agents.

M.D., Virginia.

ANSWER.—Ethyl alcohol in 70 per cent solution by weight is an efficient skin disinfectant, especially when used with gauze friction for two or three minutes (Price, P. B.: Ethyl Alcohol as a Germicide, *Arch. Surg.* 38:528 [March] 1939). This action is independent of any detergent quality of the solution. Disadvantages of alcohol lie in the narrow range of its strongly germicidal concentrations and the bother of preparing and maintaining solutions exactly 70 per cent by weight. Alcohol is useful in cleaning and degerming cutaneous margins of wounds, but in wounds it is painful and useless if not harmful.

Ether is a prime fat solvent, but its detergent effect on surfaces is negated to a certain extent by rapid evaporation. An ether sponge may remove numbers of "transient" bacteria along with the grease and dirt. But ether rates low as a germicide. It is incapable of reducing the "resident" flora of the skin (Price, P. B.: Surgical Bacteriology and Technique, *THE JOURNAL*, Nov. 26, 1938, p. 1993). The routine use of ether as a step in preparation of the field of operation is of doubtful value. In recent freshly contaminated wounds, used with gentle friction, ether seems to have some value in preventing development of infection; it may thus improve the chances of successful primary closure of wounds. But in old chronically infected wounds it is ineffective. In this connection it is well to remember that ether precipitates proteins.

No dependable studies of the skin disinfectant action of acetone are known. But since this agent under optimal conditions in vitro is but weakly germicidal, it is not likely that the relatively small amounts present in various preparations of dyes have any disinfectant action per se. Acetone is usually added with the idea of increasing the penetrability of dyes into the skin. That it actually accomplishes this purpose is doubtful. A fact not generally appreciated is that the presence of water, even the small amounts contained in 95 per cent alcohol, causes acetone to lose its fat-solvent property.

RHEUMATIC HEART DISEASE EARLY AND LATE

To the Editor:—A patient who was in service during the World War has a record which states that on Nov. 20, 1918, he was found temporarily unfit for overseas service on account of endocarditis. Prior to his discharge on Jan. 9, 1919, examination showed him to be physically sound with no defects. At present, physical examination shows him to be suffering from mitral stenosis with regurgitation and cardiac dilatation. The question is: Would one suffering from endocarditis be likely to recover completely within the six or eight weeks period, or is it probable that the present cardiac condition is a result of the previous attacks?

M.D., Illinois.

ANSWER.—This case is an interesting example of the fact that one may find during active rheumatism in youth cardiac abnormalities which may regress or even apparently disappear entirely. There may be murmurs, particularly systolic at the apex and even middiastolic, as the result of temporary or subacute dilatation of the heart secondary to rheumatic myocarditis even before the valves are deformed. With the recovery from the acute rheumatism the heart size may return essentially to normal with the disappearance of murmurs, but continued or recurrent rheumatic infection over the years to come may result eventually in the development of real valvular deformity, especially mitral stenosis, which eventually becomes evident on examination.

This is the probability in the case referred to, but there is also the possibility that the second examination early in January 1919 might have overlooked evidence of heart involvement which was actually present at that time.

HYPOTHYROIDISM IN PREGNANCY

To the Editor:—What should be done for a pregnant woman who displays mild symptoms of hypothyroidism and possibly hypopituitarism? She is a tertipara four months pregnant. She was sterile for five years. Anterior pituitary extract was given because of the presence of an infantile uterus and of the sterility. Significant enlargement of the uterus occurred and she became pregnant and gave birth to a normal child. Pituitary medication was given up to the first month of pregnancy. About a year and a half later, with no further endocrine therapy, she gave birth to another child, but this child at from 3 to 4 months of age displayed definite signs of hypothyroidism (cretinism). This child is still receiving thyroid.

M.D., New York.

ANSWER.—Desiccated thyroid may be started at once and the minimum dose administered that will maintain the basal metabolism within normal limits. It would probably be safe to start with 1 grain (0.065 Gm.) of U. S. P. thyroid daily and give a little more or less, depending on the basal metabolism. It should be emphasized that the basal metabolism is elevated as much as from 25 to 30 per cent above normal in the last three months of pregnancy, making it necessary to determine the maintenance dose as well as possible in the first half of pregnancy. If animal experiments reflect the state of affairs in man, the administration of thyroid to mothers with hypothyroidism reduces the incidence of cretinism in the offspring. No pituitary extract should be given during pregnancy.

BRONCHIAL ASTHMA AND THYROIDECTOMY

To the Editor:—A woman aged 46 complains of bronchial asthma, which started three years ago about three months after a thyroidectomy. The patient gives no history of allergy other than the asthma, which she insists was in some way or other precipitated by her operation. She even asserts that she found in some newspaper health column reference to the fact that bronchial asthma may be caused or precipitated by thyroidectomy. She has been given cutaneous tests and been found sensitive to cattle hair and horse dander and was relieved by desensitization with these allergens. Is the relation between the operation and the onset of the asthma likely to be coincidental, or is it possible that the patient's theory is correct?

Walter Lewinnek, M.D., Mason City, Ill.

ANSWER.—There is no definite relationship between thyroidectomy and bronchial asthma. It is true that a substernal thyroid can cause wheezing by pressure on the trachea or on one of the main bronchi, in which case the wheezing would usually be found on the side of the pressure. True bronchial asthma, however, is bilateral and has no relationship to thyroid disease and thyroidectomy.

HYPERTROPHY OF GUMS FROM DILANTIN SODIUM

To the Editor:—A girl aged 20 years has had essential epilepsy since she was 15. There are petit and grand mal attacks. About twenty months ago I gave her four capsules of dilantin sodium every twenty-four hours. Previously large doses of phenobarbital did not control the attacks, but the dilantin sodium, taken with vitamin C, has been satisfactory, except for a gradually increasing hypertrophy of the gums. This condition has lately become so acute that I have had to stop the dilantin sodium. The attacks of epilepsy have almost immediately become acute again. I should appreciate any advice as to the treatment of the hypertrophy and suggestions as to the advisability of continuing the treatment with dilantin sodium. Is there anything new on the treatment of the gum condition? Is there danger of this condition not yielding to treatment if dilantin sodium is given regularly?

M.D., Georgia.

ANSWER.—Hypertrophy of the gums is a recognized complication of treatment with dilantin sodium in children. Recent investigations have shown that the process is entirely different from that seen in scurvy and that it bears no relationship to the vitamin C level. Aside from the appearance of the gums, the hypertrophy appears to do no harm, even when it persists over years. It is often preferable to the attacks.

It might be worth while to try substituting phenobarbital 0.1 to 0.2 Gm. daily for a similar amount of dilantin sodium. A vigorous outdoor life is often beneficial.

References:

- Kimball, O. T., and Horan, T. N.: The Use of Dilantin in the Treatment of Epilepsy, *Ann. Int. Med.* 13:787 (Nov.) 1939.
 Merritt, H. H., and Putnam, T. J.: Sodium Diphenyl Hydantoin in Treatment of Convulsive Seizures; Toxic Symptoms and Their Prevention, *Arch. Neurol. & Psychiat.* 42:1053 (Dec.) 1939; Further Experiences with the Use of Sodium Diphenyl Hydantoin in the Treatment of Convulsive Disorders, *Ann. J. Psychiat.* 96:1023 (March) 1940.

ABSENT KNEE JERKS IN DIABETES

To the Editor:—What is the basis for absent knee jerks in the diabetic?
 Samuel G. Slo-Bodkin, M.D., Brooklyn.

ANSWER.—The common cause of absent knee jerks in diabetes is neuritis (neuronitis). The explanation for its frequent occurrence in diabetes is not entirely clear except that it is in some way due to the effects of diabetes on the central nervous system. Other conditions responsible for absent reflexes may be present coincidentally.

SUBACUTE BACTERIAL ENDOCARDITIS

To the Editor:—1. Has there been any definite value in transfusion of blood from a patient who has recovered from Streptococcus viridans endocarditis? 2. Is a list of donors available? 3. By what criteria is it determined that one has recovered from subacute bacterial endocarditis? 4. Does recovery mean that the danger from embolism has passed? 5. Is the coronary artery the most likely site for embolism and is recovery possible?
 W. D. Bretz, M.D., Huntingburg, Ind.

ANSWER.—1. There has been a great deal of newspaper publicity implying that blood transfusions from a patient who has recovered from Streptococcus viridans endocarditis are curative. There is no adequate evidence that such transfusions have resulted in cure.

2. So far as known, no list of donors is available.

3. Many patients experience a period of arrest, but only after two or three years of freedom from fever and absence of other symptoms can a patient be considered to have recovered.

4. There is but little danger of embolism after a three year period of freedom from all symptoms, although it may occur.

5. The coronary artery is not a common site of embolism, although signs of small emboli in the heart muscle have been reported post mortem not infrequently. Such emboli are not often fatal.

"BABYKIN" BOTTLE CONTAINER

To the Editor:—Lately several mothers have asked me about "Babykin" Scientific Container, made by Lockwood Products, Chicago. This container is supposed to keep a baby's formula just the right temperature for a 2 a. m. feeding, even though placed in the "babykin" at 10 p. m. We have always known that placing warm or hot milk into a vacuum bottle causes an abnormally large number of bacteria to grow and the formula to become sour within a few hours, usually producing a gastrointestinal disturbance if the baby takes such a feeding. Is there any difference between the "Babykin" and the regular vacuum bottle?

Leonard F. Bender, M.D., Philadelphia.

ANSWER.—There is some difference between the "Babykin" and the regular vacuum bottle in that liquids are put directly into the vacuum bottle while the "Babykin" is meant only to hold the baby's milk, which is stoppered in the regular baby's bottle. Milk put directly into the vacuum bottle may be contaminated by bacteria on the cork and within the bottle itself. It is not possible to sterilize the vacuum bottle, since heating will break it. Thus, milk put into a vacuum bottle and kept

warm will probably sour within a short time. However, the milk in the baby's bottle which has been boiled and sterilized will not sour within a period of twelve hours or longer. The use of the "Babykin" for a reasonable period appears to be safe.

INJECTION OF TRYPSIN IN MAN

To the Editor:—Can a dilute sterile solution of trypsin (the enzyme) be injected subcutaneously into a human being without ill effects? The enzyme in the solution is active. Maurice Vaisberg, M.D., New York.

ANSWER.—Trypsin is extremely toxic and gives rise to symptoms resembling those of snake venoms. (Rocha e Silva, M.: *Arch. f. exper. Path. u. Pharmacol.* 194:335, 1940).

VACCINES FOR TYPHUS

To the Editor:—Is there a serum or vaccine, not experimental, for typhus fever that is now known to be effective? Our board of health is using one and I have not used it as my reports say it is not yet of proved worth. H. A. Geitz, M.D., Monterrey, Mexico.

ANSWER.—Several vaccines prepared from tissue cultures of the specific rickettsia of typhus fever are being tried experimentally. An extensive experiment is being carried out in Europe at the present time but as yet no serum or vaccine against typhus possesses proved value.

X-RAY THERAPY FOR CARCINOMA OF PANCREAS

To the Editor:—Is x-ray treatment of any value for carcinoma of the pancreas? In the case I have in mind an anastomosis between the gall-bladder and the jejunum has been done to relieve the biliary obstruction.

M.D., New York.

ANSWER.—There is no authentic evidence available to indicate that x-ray therapy is of any value for carcinoma of the pancreas.

AMBULATORY AUTOMATISM OR FUGUE

To the Editor:—The inquiry from a physician in New York in The Journal, August 10, concerning his compulsive movements and the answer suggesting a psychic epileptic equivalent interests me because it has three unusual features: 1. It occurs only at night. 2. It does not occur at night except when he goes to his office. 3. His fugue consists largely of this motor component without any accompanying dreamy state or amnesia. The length of the attack and its sudden stoppage when the physician leaves for home makes one believe there is a neurotic component. The answer considers this possibility. I wonder, therefore, why the suggestion was made for 1 Gm. of sodium bromide to be taken three times daily. May I also comment on the references. The first should be Oppenheim and not Oppenheimer. This reference is to Bruce's English translation of a rather old book which I first translated forty years ago for J. B. Lippincott & Co. The best review of the subject today is that by S. A. Kinnier Wilson, "Modern Problems in Neurology" (1926), published by Williams and Wilkins, Baltimore. Gower's book on "Epileptic Equivalents," although printed many years ago, is still the best monograph that has been written on this subject.

Edward E. Mayer, M.D., Pittsburgh.

POLIOMYELITIS AND TONSILLECTOMY

To the Editor:—In Queries and Minor Notes (The Journal, September 7, p. 877) the first reply to the question on poliomyelitis and tonsillectomy refers to a group of cases of the bulbar type reported by Aycock and Luther (New England J. Med. 200:164 [Jan. 24] 1929) as having followed tonsillectomy "by seventeen to eighteen days, an interval corresponding with the incubation period of the disease." The interval between tonsillectomy and onset of the disease in this group of cases was actually seven to eighteen days.

A second reply to the question expresses doubt as to whether tonsillectomy is a predisposing factor to infantile paralysis because of the great number of such operations performed in the fall of the year "without any apparent material increase in the number of cases of infantile paralysis." While we have seen three bulbar cases following tonsillectomy in the practice of one physician within a month (175 tonsillectomies), it is true that few or no such cases may be encountered in even a large series of tonsillectomies; but any sizable study of poliomyelitis will show a greater proportion of cases of the bulbar type following tonsillectomy by a specific interval than would occur by coincidence. For example, Eley and Flake (J. Pediat. 13:63 [July] 1938) reported that eight (2.07 per cent) of 287 patients with spinal poliomyelitis admitted to the Children's Hospital, Boston, had had tonsillectomy within a month, whereas seventeen (12.98 per cent) of 131 with the bulbar type admitted during the same period had had tonsillectomy within a month. Of greater significance was the time interval between tonsillectomy and onset of the disease in the two groups. The eight spinal cases followed tonsillectomy by seven to thirty days (random), whereas all seventeen of the bulbar cases occurred between the tenth and twentieth days following tonsillectomy. It should be noted that one patient had only adenoidectomy.

While it cannot be said that season per se constitutes a contraindication to tonsillectomy, it is clear that the avoidance of this operation where poliomyelitis is prevalent undoubtedly would prevent the occurrence of a number of cases of this distressing and highly fatal form of the disease each year.

W. Lloyd Aycock, M.D., Boston.

Harvard Infantile Paralysis Commission.

Medical Examinations and Licensure

COMING EXAMINATIONS

BOARDS OF MEDICAL EXAMINERS BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of boards of medical examiners and boards of examiners in the basic sciences were published in *THE JOURNAL*, September 28, page 1123.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Parts I and II. Various centers, February. Part III. Baltimore and New York during October and Boston during November. Exec. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Written*. Various centers, Feb. 20. Final date for filing application is December 21. *Oral*. Cleveland, May 31-June 1. Final date for filing application is April 1. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Oral*. Chicago, Dec. 6-7. Applications for Group A must be on file not later than Nov. 1. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written*. Parts 1-A and 1-B, Feb. 17. Final date for filing application is Jan. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: Chicago, Oct. 18-19. Sec., Dr. R. Glen Spurling, 404 Brown Bldg., Louisville, Ky.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Part I Group B examinations, locally, Jan. 4, 1941, at 2:00 P. M. Final date for filing application is Oct. 5. Part II, Groups A and B, Cleveland, Ohio, June 1941, immediately prior to opening of A. M. A. meeting. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OPHTHALMOLOGY: *Oral*. Cleveland, Oct. 5. *Written*. Various centers, March 8. *The only written examination during 1941*. Applications must be on file not later than Dec. 1. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Oral and written*. New Orleans, January 1941. Final date for filing application is November 15. Sec., Dr. Fremont A. Chandler, 6 N. Michigan Ave., Chicago.

AMERICAN BOARD OF PEDIATRICS: New York, March 30-31, following the Region I meeting of the American Academy of Pediatrics. Chicago, May 18, following the Region III meeting of the American Academy of Pediatrics. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: *Oral*. New York, December 18-19. Final date for filing application is October 10. Sec., Dr. Walter Freeman, 1028 Connecticut Ave. N.W., Washington, D. C.

AMERICAN BOARD OF UROLOGY: *Oral and written*. Chicago, February 1941. Applications must be on file not later than Oct. 15. Sec., Dr. Gilbert J. Thomas, 1009 Nicollet Ave., Minneapolis.

Missouri June Report

Dr. Harry F. Parker, secretary, State Board of Health of Missouri, reports the written examination held for medical licensure at St. Louis, June 6-8, 1940. The examination covered fifteen subjects. An average of 75 per cent was required to pass. One hundred and sixty-one candidates were examined, all of whom passed. Twelve physicians were licensed to practice medicine by reciprocity. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
College of Medical Evangelists.....	(1940)	88.8	
Northwestern University Medical School..(1930)	88.4, (1940)	81,	
87.7, 87.8, 88.2, 88.4			
Rush Medical College.....	(1939)	88.6, 90	
University of Illinois College of.....		86, 89.2	
University of Kansas School of.....		85	
Univ. of Louisville School of.....		88.7	
Tulane University of Louisiana.....		87.3	
Harvard Medical School.....	(1937)	89.5	
St. Louis University School of Medicine..(1938)	90.7, (1939)	85.2,	
(1940) 81.7, 82.2, 83.5, 83.6, 83.8, 84, 84.2, 84.2,			
84.7, 84.7, 84.8, 84.8, 85, 85.2, 85.3, 85.3, 85.4, 85.5,			
85.6, 85.6, 85.6, 85.6, 85.8, 85.8, 85.9, 86.4, 86.4,			
86.4, 86.4, 86.6, 86.6, 86.7, 86.7, 87, 87.1, 87.2, 87.2,			
87.4, 87.4, 87.5, 87.6, 87.9, 88, 88, 88.1, 88.3, 88.4,			
88.4, 88.6, 88.7, 88.7, 88.8, 88.8, 88.9, 88.9, 89.1,			
89.2, 89.2, 89.5, 90.1, 90.7			
Washington University School of Medicine..(1937)	88, (1940)	82.3,	
82.4, 83, 83.9, 84, 84.2, 84.2, 84.4, 84.4, 84.5, 84.5,			
85.2, 85.2, 85.6, 85.7, 85.8, 85.9, 86, 86, 86.1, 86.1,			
86.2, 86.2, 86.3, 86.4, 86.5, 86.5, 86.6, 86.6, 86.6, 86.6,			
86.6, 86.7, 86.7, 86.8, 86.8, 86.8, 86.9, 87, 87, 87,			
87.1, 87.2, 87.2, 87.3, 87.3, 87.3, 87.4, 87.5, 87.5,			
87.6, 87.6, 87.6, 87.8, 88, 88.2, 88.2, 88.3, 88.4,			
88.6, 88.6, 88.8, 88.9, 89.2, 89.4, 89.4, 89.5, 89.6,			
89.7, 89.7, 89.9, 89.9, 90.6, 91.2			
Creighton University School of Medicine.....(1940)		85.9	
University of Nebraska College of Medicine.....(1939)		86.8	
University of Oregon Medical School.....(1939)		88	
Jefferson Medical College of Philadelphia.....(1938)		86.7	
University of Toronto Faculty of Medicine.....(1939)		89.8	

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Arkansas School of Medicine.....	(1939)		Arkansas
Loyola University School of Medicine.....	(1939)		Kansas
Univ. of Kansas School of Medicine..(1926), (1931), (1939)			Kansas
University of Louisville School of Medicine.(1933), (1939, 2)			Kentucky
University of Nebraska College of Medicine.....(1939)			Nebraska
Ohio State University College of Medicine.....(1939)			Ohio
University of Cincinnati College of Medicine.....(1932)			Ohio
Meharry Medical College.....(1924)			W. Virginia

Book Notices

The Australian Army Medical Services in the War of 1914-1918. Volume II: The Western Front. By Colonel A. G. Butler, D.S.O., V.D., B.A. Cloth. Price, 21s. Pp. 1,010, with 212 illustrations. Canberra: Australian War Memorial, 1940.

This volume is concerned chiefly with the operations of the Australian army medical service on the western front, 1914-1918. The book is divided into three sections and fourteen appendixes.

Section I is a narrative of those aspects and events in which the Australian forces directly participated until the end of 1917. The course of the fighting is followed chronologically from the preliminary sorties and feints leading up to the battle of the Somme until the third battle of Ypres. The battle of Cambrai, big in its import and omen if slight in its direct effects, completed the old and points the new phase of the war.

Section II examines, from an objective service standpoint, the fundamental problems of the prevention of disease and of the rescue, repair and return to duty of casualties. Accordingly, the chapters of this section follow the course of a casualty from the regimental aid post through the various stages and levels of transport and treatment in the field, at the expeditionary base and at home, to the command depots and overseas training brigade. A final chapter of the section examines the technic of disease prevention.

Section III resumes the narrative of the experiences of the Australian army medical service on the western front. The successive blows in the British advance up the Somme to the Hindenburg line are described. The dual task facing the Australian medical service is clearly brought out. Within eight weeks it was necessary to deal with one seventh of the total battle casualties and to sustain the chief part in the problem of maintaining the fighting formations at a strength adequate for these stupendous tasks—and this in the face not only of casualties but of pandemic influenza. Not the least significant feature of the Australian army medical service in the war is revealed in the fact that, of the effectives that reached the front, no less than 60 per cent were recovered men.

As related in this volume, the salient lessons that seem to emerge from the Australian experience in the evacuation of wounded in the great war may be thus summed up: 1. In any great battle a proportion—which may be estimated at some 2 to 5 per cent—of all casualties other than from gassing will, if their lives are to be saved, require special arrangements for insuring early operation or for effective first aid at a field or mobile hospital. 2. For the rest, success in evacuation is in a great measure determined by the exact and early discrimination of stretcher cases, "sitters" and "walking wounded" and the making of special and adequate arrangements for the transport and treatment of each class. 3. The basic principle, to insure successful evacuation under all conditions and every combination of circumstance, the medical scheme must adapt its arrangements to the fundamental constants, physical, physiologic and pathologic, which lie, and will always lie, behind the particular problems of all types of warfare and of every battle.

This volume has mirrored truly the interplay of the constant factors that compose the medical problem—time and distance, mass and movement, human powers and human limitations—which are common to any type of warfare. Only one feature prevents this volume from being an intensely interesting and readable work. Too many abbreviations cause too many interruptions to those unfamiliar with the British medical evacuation system; otherwise this volume may be recommended to any one studying or contemplating active medical field service as a mine of exact information.

Localisations viscérales et aspects chirurgicaux des brucelloses. Par R. Michel-Béchet, associé national de l'Académie de chirurgie. Avec la collaboration de MM. R. Pulg et P. Charvet. Préface du Pr B. Cunéo. Paper. Price, \$1.15. Pp. 168, with 22 illustrations. Paris: Masson & Cie, 1939

It is gratifying to American investigators of human brucellosis in its varied forms to find in so valuable a book as that of Michel-Béchet and his collaborators that these French authors have discarded the former designations of the disease—Malta, or undulant, fever—names which were probably to some extent responsible for the failure to recognize phases of the disease which occur without significant rises in temperature. The authors emphasize that there is no definite pattern of brucellosis. Nothing is more fantastic, they say, than the evolution of this disease. The onset may be insidious, or an attack of indigestion suggests intestinal grip; or pain in the joints suggests rheumatism, and it is only after the attacks have been repeated a few times that one thinks of brucellosis.

Four cardinal signs are mentioned as characteristic of the septicemic phase of brucellosis: temperature, pain, perspiration and weakness. The rises in temperature may occur in waves (which suggested the name "undulant fever"). But the undulating temperature curve is not a constant feature. It may vary in intensity; the undulations may proceed without intervals; after weeks or months of apparent health a new wave may appear. The French have a name for it: "lunatic fever." There is an uncertainty as to whether brucellosis can occur without fever, because in some cases observations of temperature are not made in the initial period, which may be more or less ignored. The afebrile form of the disease is encountered especially in children. The painful manifestations of brucellosis are extremely varied. They may involve joints, nerves or subcutaneous tissues. Asthenia is an important feature. It may deprive the patient of all energy or desire for a normal life, persisting for a long time without accompanying fever, pain or perspiration. A psychic factor may be involved in the asthenia. The patient who has been disabled for a long time, discouraged by persistent pain and disappointed with the failures of therapy may fall into a kind of apathetic resignation. Sometimes after long periods of asthenia there will be a relapse, with localization of the infection.

Orchitis occurs in about 20 per cent of cases. The genital organs of the female are less frequently affected. Although in domestic animals abortion is a unique manifestation of brucellosis, in women brucellar infection seems to have no more effect on gestation than any other septicemia. Anemia with leukopenia and monocytosis with polymorphonuclear leukocytes falling to 40 or 50 or even as low as 20 per cent form a characteristic blood picture. Epistaxis is a frequent symptom. Other symptoms observed are indigestion with stubborn constipation, anorexia, diarrhea in severe cases, enlarged liver and, less frequently, enlarged spleen. The heart and kidneys are rarely affected. These symptoms characterize the average case. The authors emphasize, however, that the disease cannot be codified. The book describes other manifestations which occur irregularly and are of little diagnostic value.

Convalescence is prolonged. After apparent recovery a new wave of fever may occur with or without a return of the original symptoms or with painful osseous or nervous complications. Brucellosis presents an infinite variety of evolutions which may be violent or mild. In certain parts of France the disease is a veritable social scourge. Whether there is ever complete recovery from brucellosis is a question the authors raise without answering, except by citing cases in which there were recurrences long after apparent recovery.

The authors found it difficult to estimate the percentage of cases of brucellosis in which complications develop because, as a rule, patients with uncomplicated brucellosis do not enter the hospital. They state, however, that in 80 per cent of cases with localization of the infection the localization was preceded by a recognizable septicemic phase of the disease.

Brucellar hepatitis is the most frequent localization. It can be the only manifestation of the infection. At the time of the third or fourth wave of fever the liver may increase in volume and become painful; diverse hemorrhages may appear—bleeding gums or purpura especially on the lower limbs, associated or

not with edema. These symptoms and the various complications which may be associated with them are discussed in detail, with case reports. Brucellar infection can invade the biliary tract, causing angiocholitis or cholecystitis. The authors believe they are the first to report that brucellar infection may be the cause of biliary lithiasis.

Nervous complications are second in order of frequency. They resemble the nervous symptoms of syphilis more closely than those of any other infectious disease. The different aspects of neurobrucellosis, with detailed discussion and case reports, are enumerated: (1) the encephalitic syndrome, (2) the medullary syndrome, (3) the peripheral syndrome, (4) the meningeal syndrome. Any one of them may be acute or chronic. A chapter is devoted to respiratory complications. Brucellar laryngitis, tracheobronchitis, pulmonary congestion all resemble tuberculous infections. Errors in diagnosis are frequent. In a section of the book entitled "Surgical Aspects of Brucellosis" are included visceral, osseous and osteo-articular localizations, with separate chapters devoted to the complications which are of especial interest—facial lesions, osteoperiostitis, osteo-arthritis, coxitis, spondylitis.

The dry black facial lesions have a marked predilection for the area over the body of the jaw in front of the masseter. They may be bilateral. The topography and behavior of these lesions are so precise that a retrospective diagnosis of brucellosis may sometimes be made in cases in which the correct diagnosis was missed. Cases in which the facial lesions develop are usually severe and end fatally.

Osteoperiostitis may develop in the course of the second or third wave of fever or early in convalescence. In some cases it is the only manifestation of the disease.

Osteo-arthritis seems to occur most frequently in young people. Localization in the hip is most frequent, followed by the knee, the elbow, the shoulder and the sacro-iliac joints. The inflammatory lesions may be acute or chronic. They usually develop during convalescence and accompany a recurring septicemic episode. But they can be the only manifestation of a relapse with no rise in temperature or they may mark the beginning of the disease. In such cases errors of diagnosis can easily be made. Clinically the osteo-arthritis of brucellosis may be subacute or chronic, resembling tuberculosis; or acute, resembling a gonococcal infection. The pain may be violent. As a rule, however, there is an absence of suppuration and ankylosis.

Reports of three cases of coxitis are given. In one of them there had been no fever for three years previous to the development of the painful joint; in one there was no other manifestation of brucellosis; the third case was extremely acute, with the temperature rising to 40 C. (104 F.).

Under the term spondylitis the authors designate all localizations in the vertebral column detectable by x-ray examination, whether osseous or osteo-articular, acute or subacute, excluding the simple vertebral reactions of brucellar septicemia, which are almost constant. The subject is treated extensively, with many reproductions of roentgenograms. Spondylitis occurs much more frequently in men than in women; it occurs especially in patients past 40. The lumbar region is most frequently affected. Sometimes spondylitis develops long after the septicemic episode; it may be unaccompanied by an elevation of temperature. The patient may be incapacitated six or eight months or more.

Brucellosis is fatal in only 2 to 4 per cent of cases. Its seriousness lies in the length of evolution, in the painful manifestations and in the persistent weakness it leaves. It ruins poor people.

The responsibility which should be assumed for veterinarians, dairymen and others who are infected in line of duty is discussed, together with the difficulties involved. In the case of slaughterhouse workmen in cities, where the foyers of infection is known, the difficulties of authentication are relatively slight. On the contrary, in rural districts where there is the possibility of contracting infection from food or various objects soiled by infected animals, it would be almost impossible to prove that the infection was contracted in line of duty.

The authors discuss the various methods of treating brucellosis under (1) anti-infectious therapy, chemical or biologic, and (2) symptomatic therapy. They do not heartily endorse any of the

proposed methods of anti-infectious therapy. On account of the irregular evolution of the disease they are always skeptical, they say, in reading statistics of therapeutic successes. Nourishment should be substantial. The authors insist that even patients with high temperature must take as much nourishment as possible. Each physician must judge for himself the best medication for the particular manifestations which he finds: for example, vitamin B for nervous complications, soporifics for patients troubled with insomnia.

Experimental Poliomyelitis. I: A Critical Review of the Literature with Special Reference to the Use of the Neutralization Test in Immunological Studies. II: The Neutralization Test. A Study of Some Factors Involved in the Neutralizing Action of Immune Serum Against Poliomyelitis Virus. By Morris Schaeffer, Ph.D., and Ralph S. Muckenfuss, M.D. Department of Health. Bureau of Laboratories, New York, N. Y. Published under the auspices of The National Foundation for Infantile Paralysis. Paper. Pp. 158. Lancaster, Pa.: Science Press Printing Company, 1940.

The authors describe their extended experience with neutralization tests in experimental poliomyelitis, which in large part consisted in 440 tests with one pool of virus and one pool of human convalescent serums. On the average, the outcome of one test out of six was irregular according to Aycock's analysis of the data, while one test out of four was irregular as judged by the criteria of Schaeffer and Muckenfuss. Thus they regard the present neutralization test as not practical for quantitative purposes and they consider that all attempts to define a minimal infective dose of virus have been unsuccessful. They reason that general epidemiologic principles but not specific immunologic problems have been elucidated by the test. They accept the widespread distribution of humoral neutralizing substances in man and a general immunologic relationship between all strains of poliomyelitic virus. They regard as unsettled the existence of specific immunologic differences among strains and they believe that a relation between protection against infection and the presence of neutralizing bodies in the blood does not hold for individuals either in the experimental or in the natural disease. In this last view they are supported by other authorities, but it is not clear that this aspect of the problem has been studied adequately with the proper epidemic strain. The original experiments presented in part II were planned to bring to light factors which might eliminate irregular results. One supply of virus was used throughout. This consisted of a glycerinated pool of spinal cords from fifty monkeys. As the experiments progressed two leads were uncovered. One concerned the use of a short needle (one fourth inch) for intracerebral inoculation and the other was the substitution of the cisterna magna for the cerebral hemisphere to receive the inoculation. It might be noted in passing that the aging of the pool of virus might have been a factor of importance also. Emphasis in the text is specialized and the book will be of most value to those interested in the technical features of the neutralization test. The bibliography contains 289 titles.

Differential Diagnosis in Internal Medicine. By Prof. Dr. Med. O. Naegeli. Authorized English translation by Simon B. Spilberg, M.D., Head of the Department of Internal Medicine, Mount Sinai Hospital, Milwaukee, Wisconsin. Cloth. Price, \$10. Pp. 726, with 162 illustrations. Chicago: S. B. Debour, Publishers, 1940.

This is a good book, particularly for those specialists of internal medicine who have had sufficient background and training to appreciate symptom complexes rather than general descriptions of diseases. The author presumes that the reader is well acquainted with disease pictures and particularly with hematology and emphasizes in his preface that the importance of hematology in differential diagnosis has not been sufficiently appreciated. Throughout the entire book it is therefore noticeable that the author directs attention to the possible significance of the blood as a differential diagnostic aid. The chapters on the anemias, hemorrhagic diathesis, leukemia and allied diseases are exceedingly well presented. What is especially important is the presentation of clinical observations which have been gained only through years of experience. Such facts are most valuable to the physician in differentiating the questionable cases. An excellent illustration of this is the chapter on special differential diagnosis of pernicious anemia. It is regrettable that in these chapters there are not more illustrations of blood smears. Otherwise, however, the entire book is well illustrated with appropriate diagrams, photographs

and brief but carefully selected case histories. The chapter on the symptom complex of a large spleen with gastrointestinal hemorrhage, which deals especially with chronic thrombosis of the portal vein and of the splenic vein, is commendable since the clinical picture is in general too little known but is highly characteristic. The subjects presented cover the entire field of internal medicine and diseases of the nervous system. Special comment should be made of such chapters as those on the differential diagnostic significance of electrocardiographic observations, the differential diagnosis of pains in the back and flank caused by root sciatica, lumbago, disorders of the spine, prostatic diseases and polyneuritis, the differential diagnosis of psychoneurosis from organic disease especially in insurance compensation, psychoneuroses, demand neuroses, vasomotor neuroses, encephalosis post-traumatica after skull injury and gross organic traumatic diseases of the brain. Probably the weakest chapters are those dealing with hypertension and nephritis. The book is exceedingly well printed but the binding could be improved. The translator has performed a creditable task in presenting this book to the medical profession.

The Badianus Manuscript (Codex Barberini, Latin 241) Vatican Library: An Aztec Herbal of 1552. Introduction, translation and annotations by Emily Walcott Emmart. With a foreword by Henry E. Sigerist. Cloth. Price, \$7.50. Pp. 341, with 118 plates. Baltimore: Johns Hopkins Press; London: Oxford University Press, 1940.

One of the most interesting books that have appeared dealing with the early history of medicine on the Western Continent is the reproduction of the Badianus Manuscript. The original of this volume, which appeared in 1552, is in the Vatican Library. It is an Aztec herbal and is not only the earliest complete Mexican medical treatise which is known but is also the only medical text known to be the work of the Aztec Indians. The authors of the herbal were two Indians, Martinus de la Cruz, the writer of the text, and Juannes Badianus, "reader in Latin," who translated it into that language. Both men were at the College of Santa Cruz at Tlaltilulco. The original volume, of which this is a facsimile, is a small book bound in sixteenth century crimson velvet which shows the imprint of metal clasps. The Latin text of the original has been translated for this facsimile by Dr. Emily Walcott Emmart, who has included in the book an extensive and interesting introduction describing the original volume and its history as far as it is known. This introduction also discusses the colors used in the original illustrations, the nature of the pigments employed and their symbolism, together with a chapter on mythology and materia medica as they are represented in the volume. Finally there is also a description of Aztec herb gardens.

In this volume are reproduced in color the 118 pages of the herbal showing 184 illustrations of native plants and trees which were employed by the Aztecs in the practice of the healing art. These illustrations are of great interest, as they are the earliest known pictures of American botany. They are reproduced from photographs taken in the Vatican Library, the beautiful water color reproductions being the work of Madame Marie Thérèse Missonnier-Vuillemin, niece of Eugene, Cardinal Tisserant, prefect of the Vatican Library. The colors in the original paintings have been admirably reproduced by the printer Mr. A. B. Hoen. Many of the plants are difficult of recognition, as they are all drawn of one size and are lacking in perspective. As the translator, Badianus, did not know the Latin botanic names for the plants they are all labeled with their Indian names, so that the plants are in many cases hard to identify. Under each picture is the name of the disease or condition for which the plant is to be used and this is followed by a brief description of the way it is to be employed.

The work is divided into different chapters, each one treating of a certain class of disorders. For example, chapter I treats of "the head, boils, dandruff, scabies, falling hair, lacerations or fractures of the head"; chapter II of the eyes; chapter III of the ears; chapter IV of "coryza, medicine to be instilled into the nose, blood herb," and so on. Besides these and many other medical conditions for the treatment of which remedies are provided, directions are given for other states which perhaps may be considered as nonmedical. Among these is the "herb for lassitude" and "trees and flowers for the fatigue of

those administering the government and holding public office"; for the latter use some fifty drugs are mentioned, including the brains and bile of several animals, among them the coyote and the skunk. Some of the references to diseases are quite good, as for instance the discussion of the treatment of fevers, in which the main symptoms of the condition are well listed.

Naturally the remedies mentioned are by no means confined to the vegetable kingdom, as a large number of animal and mineral products are also advised. Among these as illustrations may be mentioned a purple or white stone from the stomach of a swallow, inhalation of the odor of burning hair, pebbles collected from brooks, an Indian kite and dove ground in water, and a burned heart of a stag ground in water.

Enough has been said to indicate the general character of this interesting work. It should be pointed out that the publication of the facsimile has been made possible only through the cooperation and support of the Smithsonian Institution, various garden clubs, which were interested in it on account of its being the earliest herbal of the New World, and finally a number of individuals who contributed generously to the project.

The facsimile volume is a fine example of book making and reflects great credit on the Johns Hopkins Press and the printers, A. Hoen & Co., Inc.

Principles of Hematology with 104 Illustrative Cases. By Russell L. Haden, M.A., M.D., Chief of the Medical Division of the Cleveland Clinic, Cleveland. Second edition. Cloth. Price, \$4.50. Pp. 362, with 167 illustrations. Philadelphia: Lea & Febiger, 1940.

The appearance of the second edition of this excellent book one year after the first attests its popularity. There are fourteen additional pages, and more than twelve illustrations have been added. The material is presented in terms of the physiology of blood and its pathologic variation. Morphology, although emphasized, is used to describe processes and mechanisms rather than names of structures. Haden feels that "the average physician should not attempt to interpret conditions which puzzle even an experienced student of the blood" and so has omitted the technic of supravital staining and biopsy and puncture of the bone marrow. The details of technical methods of blood examination are well presented, and new and helpful features have been added. The clinical features of the diseases are brought out as the "mechanism" of the disease, and the classic features are elaborated in the case reports. Therapy is treated in the same way. The 104 cases described, if carefully studied, would constitute an excellent form of postgraduate review for the student of hematology. The photographs are unusually good, many features being brought out in black and white with the same degree of clearness as some colored pictures. The diagrams in chapters 8 and 9 illustrating the formation, circulation and destruction of red and white blood cells in various conditions are nonmedical in character and probably would be of more value to the lay student than to the average physician. It is quite possible that some hematologists will take issue with the terminology and classifications, but hematology has not yet reached the stage when differences of point of view or nomenclature necessarily mean that one author is correct and another one wrong. The book is the best introduction to hematology that is available to medical students or practitioners and, because of its excellence and simplicity, will serve to standardize many variable features which now confuse both patient and physician.

Thirty-Seventh Annual Report 1938-1940 of the Imperial Cancer Research Fund. Founded under the direction of the Royal College of Physicians of London and the Royal College of Surgeons of England, 1902. Incorporated by Royal Charter, 1939. Paper. Pp. 43. London: Royal College of Surgeons, 1940.

Gye, director of the Imperial Cancer Research Fund, reports that a large part of the cancer research concerns the induction of malignant new growths by application of pure chemical substances and points out that this aspect of carcinogenesis has occupied the attention of the scientific staff of the fund for several years. Pullinger has found that polycyclic hydrocarbons which have the property of inducing cancer evoke, on the second to the fourth day after application, a reaction which is characteristic and may be specific. The chemically related hydrocarbons which do not induce cancer formation do not evoke the reaction. Crabtree's experiments indicate that substances with

the biochemical property of inhibiting cell glycolysis can, under different experimental conditions, either retard or accelerate the rate of induction of tumors by carcinogenic hydrocarbons.

The original observations of Cramer and Horning that brown degeneration of the adrenals occurs in mice which have been subjected to prolonged treatment with estrogen have been confirmed by Burrows, Lacassagne and Dobrovolskaia-Zawadskaia. Subsequent research on more extensive material, on many inbred strains of mice of high, medium, low or no cancer incidence, both by Cramer and Horning and by Dobrovolskaia-Zawadskaia, has shown that brown degeneration is not an invariable lesion present in cases of mammary cancer and that it is merely incidental to the physiologic changes which are brought about by excessive estrogenization.

Ludford has been interested in the leukocytes and macrophages which infiltrate tumors in vivo in relation to malignant growth. Leukocytes and macrophages may stimulate the proteolytic activity of the malignant cells and this might be expected to facilitate invasion of normal tissues. It is conceivable that a very intense stimulation of the proteolytic activity of malignant cells might result in a breakdown of the connective tissue framework of a tumor and bring about such a disorganization of its growth as to cause regression. Ludford has carried out experiments to explore this possibility.

Foulds is preparing a report on spontaneous fowl tumors. Two spontaneous sarcomas have been transmitted by filtrates of the original tumors. This is apparently the first recorded example of transmission of a spontaneous sarcoma by filtrate. Experiments with the nonfiltrable dibenzanthracene fowl sarcoma RFD2 by Foulds and Dmochowski indicate that there are at least two antigenic substances common to the nonfiltrable RFD2 and the filtrable Rous sarcoma and that the anti-RFD2 serums contain an antibody which reacts with the Rous tumor virus which has been repeatedly washed to remove extraneous fowl protein. The report contains a discussion of the experiments with the Shope rabbit fibroma. Knox, studying the desiccation of tissues, has achieved great improvement in the activity and the reliability of dried material by attention to the technic and principles of desiccation. He has also carried out experiments designed to analyze the nature of the filtrable agent of fowl sarcomas by feeding it as far as possible from fowl protein.

The Blood Picture in Hemorrhagic Anemia. By Jane M. Leichsenring and Alice Blester with the collaboration of Hortense Hönig Delnard et al., Division of Home Economics, University of Minnesota, Agricultural Experiment Station, Technical Bulletin 139. Paper. Pp. 120. St. Paul, Minn., 1939.

This presents, according to the authors, "a comprehensive study of blood changes occurring in hemorrhagic anemia induced in dogs maintained on a synthetic diet." The bulletin contains a large amount of data carefully obtained and presented in great detail. Physical measurements include blood volume measurements expressed in terms of cubic centimeters per kilogram of body weight; erythrocyte and leukocyte counts; determination of the hemoglobin, and measurement of the cell diameters and mean corpuscular volume. Chemical measurements include the oxygen capacity; total amino acid, nonprotein and urea nitrogen; preformed creatinine; calcium and phosphorus, and plasma protein, with albumin and globulin partition. The data and discussions are presented with regard to the three portions of the blood, the cells, the plasma and finally the whole blood and are based on the results of short and long time experiments. As a result of these experiments it is pointed out that "judgment of an individual's condition, based on hemoglobin level, red cell count or red cell hematocrit in the very early stages of recovery (after hemorrhage) would give an erroneous conception and create a false sense of security." The application of their results to the results of both acute and chronic hemorrhage in man is discussed in some detail and the similarity between the blood picture in dogs made anemic by hemorrhage and that observed in idiopathic hypochromic anemia of man leads to the suggestion that the "latter type is frequently the result of hemorrhage." The material presented together with a large bibliography makes the bulletin invaluable for those who may undertake experimental work on the blood of dogs, although no substantial contributions applicable to the anemias of man have been made.

Traité d'ophtalmologie. Publié sous les auspices de la Société française d'ophtalmologie. Par MM. P. Baillart, Ch. Coutela, E. Redslob, E. Velter. René Onfray: Secrétaire général. Tome VIII: Thérapeutique médicale, Hygiène, médecine légale, ophtalmologie des pays chauds, ophtalmologie comparée, déontologie. Par M.M. R. Bonnardel et al. Cloth. Price, \$10.50. Pp. 1,003, with 164 illustrations. Paris: Masson & Cie, 1939.

In view of what the French have had to undergo for the past year, they deserve enormous credit for the appearance on time of the eight volume treatise on ophthalmology. The preceding seven volumes have been reviewed in these columns and this last volume conforms to the others in physical characteristics. The material here is diverse and in many instances treated in a short chapter of only two or three pages, so that a general compilation will have to suffice, as follows: medical therapeutics of the eye, ocular hygiene, legal medicine, ophthalmology in the torrid countries, comparative ophthalmology and ophthalmic deontology, which latter term Webster defines as "the ethics of duty." The authors responsible for these chapters are Bonnardel of Paris, Brion of Lyons, Caillaud of Orléans, Cantonnet of Paris, Chappé of Paris, Cosse of Tours, Coutela of Paris, Gunsett of Strasbourg, Haas of Paris, Liegard of Paris, Margerin of Paris, Monthus of Paris, Pesma of Bordeaux, Plicque of Paris, Reiss of Strasbourg, Robin of Alfort and Toulant of Algiers. The entire volume is concluded with a comprehensive index of all eight volumes. The entire work is worth while. It is only natural that American ophthalmologists will disagree in many minor points and will be unable to subscribe to some of the surgical and therapeutic measures advocated. On the whole, the work is thorough, well written and well illustrated and contains an adequate international bibliography. This is without doubt the last large bit of work that will appear from France for many a year and fortunately it is one of which the French may well be proud.

The Compleat Pediatrician: Practical, Diagnostic, Therapeutic and Preventive Pediatrics for the Use of Medical Students, Internes, General Practitioners, and Pediatricists. By Wilburt C. Davison, M.D., D.Sc., M.D., Professor of Pediatrics, Duke University School of Medicine, Durham. (Adaptation of the Title Page of The Compleat Angler by Izaak Walton, 1653.) Third edition. Cloth. Price, \$3.75. Pp. 256. Durham, N. C.: Duke University Press, 1940.

This edition of the Compleat Pediatrician will be gratefully received by the many users and admirers of the first two editions. After one has acquired the habit of relying on this practical volume containing in such concise form a wealth of pediatric information as diagnosis, therapeutics, preventive methods, information on feeding diets and nutrition, laboratory tests, and other valuable facts necessary for the pediatrician's armamentariums, each new edition is eagerly received. The present edition has been brought down to date and contains the advances in therapeutics and procedures developed in the past several years; the newer advances in the recognition of vitamin deficiencies and therapeutics are excellently presented, as is the newer knowledge of chemotherapy with special regard to the use of sulfanilamide, sulfapyridine and sulfathiazole. The volume is thin and flexible and should fit into the general practitioner's bag. The younger pediatrician starting to practice will do well to purchase a bag in which this valuable reference book will fit. An experienced pediatrician will find great aid and comfort in frequently referring to the facts in this volume which have slipped from his memory and which can be quickly and accurately referred to in the Compleat Pediatrician.

Cyclopropane Anesthesia. By Benjamin Howard Robbins, B.A., M.S., M.D., Associate Professor of Pharmacology, Vanderbilt University School of Medicine, Nashville, Tenn. Cloth. Price, \$3. Pp. 175, with 40 illustrations. Baltimore: Williams & Wilkins Company, 1940.

This book represents a review of the literature on cyclopropane as an anesthetic agent. The physiologic and chemical properties of cyclopropane are presented, as are also the concentrations required for anesthesia based on accurate determinations of the amount of cyclopropane in the patient's blood. The author's results are compared to the results of others. The effect of cyclopropane on the various systems of the body is considered—the circulatory system, with special emphasis on the effect of the agent on the heart, and the effect on the respiratory system, gastrointestinal tract, blood and tissues. The section on the clinical administration of cyclopropane is brief and not as complete as a clinician would wish it to be. Complications are dealt

with briefly, as are indications and contraindications. The explosive hazards of cyclopropane are considered briefly. Although common precautions which should be taken when this agent is employed are mentioned, many of the special precautions as they are recognized today are not mentioned. The book is of great interest to the anesthetist because it sets forth the point of view of the pharmacologist and presents data which are not so carefully studied by the clinician as by the laboratory man. The volume is a valuable contribution and should be read by all anesthetists and also those who have to do with the use of cyclopropane as an anesthetic agent.

Dental Caries: Findings and Conclusions on Its Causes and Control Stated in 195 Summaries by Observers and Investigators in Twenty-Five Countries. Compiled for the Research Commission of the American Dental Association by the Advisory Committee on Research in Dental Caries: Daniel F. Lynch, Chairman, Charles F. Kettering, Counselor, William J. Gies, Secretary. Cloth. Price, \$1. Pp. 189. New York, 1939.

This is the compilation of 195 summaries from observers and investigators in twenty-five countries followed by a general analysis, presumably by the secretary of the committee. The material for compilation was obtained by circularization of an "open letter to all investigators throughout the world in the field of dental caries" and directed to "each living person who, from research or clinical observation, has published findings and conclusions that bear in any way, directly or indirectly, on the cause or control of dental caries in man or animals." Further in the preface this statement is made: "It was not our purpose to evaluate the findings and conclusions in this book, nor to suggest which views may be regarded as most significant. Presumably, these functions will be performed publicly by reviewers and special students of caries." In spite of this the general analysis is of no little assistance in bringing order out of what would otherwise be a chaotic situation, and a situation which a reviewer could not at all clear up publicly in the space usually allotted to a review. The book serves one useful purpose; namely, and in the language of the committee, "We aimed only to compile the data and to make them readily available for constructive use by those who will promote public discussion, and who will advance further research and clinical inquiry." And again quoting: "The critical reader will be the judge of the relative values of the individual contributions." There is a definite need for such discrimination.

A Textbook of Psychiatry. By Arthur P. Noyes, M.D., Superintendent, Norristown State Hospital, Norristown, Pennsylvania, and Edith M. Haydon, A.B., R.N., Superintendent of Nurses, St. Elizabeths Hospital, Washington, D. C. Third edition. Fabrikoid. Price, \$2.50. Pp. 315. New York: Macmillan Company, 1940.

In this edition there are additional data on nursing treatment. A psychiatric nurse collaborated with the senior author in the presentation of the latter material. The book is primarily written for the student nurse and as such fills a great need satisfactorily. There are thirty-three chapters, all dealing with some phase of normal and abnormal behavior. Some of the chapters are written too briefly, even though the book is written for nurses. There is a short but good history of psychiatry and of psychiatric nursing. The book is recommended for student nurses and graduate nurses interested in psychiatry.

Feeding the Family. By Mary Swartz Rose, Ph.D., Professor of Nutrition, Teachers College, Columbia University, New York. Fourth edition. Cloth. Price, \$3.75. Pp. 421, with illustrations. New York: Macmillan Company, 1940.

This is one of the most authoritative and reliable books available in the field of nutrition. The numerous editions through which it has passed and its widespread use testify to its value. In her preface, Dr. Rose emphasizes the increased emphasis on the feeding of the child, on the feeding of the mother during the critical antepartum period and the feeding during the first years of life. There is also a discussion of the ideal maintenance diet for the adult. Economic considerations have caused a scrutiny of diets with a view to possible improvement without undue increase in cost. Attention is called also to the new emphasis that has been given to thiamine in recent years. A section on allergy has been added to the chapter on feeding the sick. The book can be unhesitatingly recommended for use as a text, for the physician who needs constantly at hand a reliable work of reference and, indeed, for the general reader.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Malpractice: Sponge Left in Abdomen: Res Ipsa Loquitur.—The physician defendant performed a cesarean section on Mrs. Key. As the patient appeared to be "a poor surgical or anaesthetic risk" it was deemed necessary to complete the operation as quickly as possible. While suturing the incision made in the uterus the physician called for a count of the sponges which he had removed from the field of operation. The nurses who were assisting him made the count and told him that it was correct and he then closed the abdominal incision. He again called for a sponge count and was again informed that the second count was correct. All the sponges used to pack off the field of operation were personally placed by the physician and were removed by him. About five weeks later it was discovered that a sponge, which had been used to prevent the transverse colon from sagging into the field of operation, had been left in the patient's abdomen. The patient and her husband subsequently sued the physician for malpractice, alleging that he had been negligent in allowing the sponge to remain in the patient's abdomen. The trial court, apparently relying on the doctrine of *res ipsa loquitur*, found, in effect, that the physician had been negligent and the physician appealed to the district court of appeal, second district, division 2, California.

The defendant contended that there was no evidence adduced at the trial to support the finding that he had been negligent. While he conceded that the doctrine of *res ipsa loquitur* was applicable, he contended that the inference of negligence, which the application of that doctrine would attribute to him, was rebutted by his own uncontradicted testimony that in performing the operation he had followed the usual, ordinary and approved medical practice. He argued that any possible inference of negligence arising from the application of the doctrine of *res ipsa loquitur* was overcome by the facts that (1) there was no medical expert testimony to any other effect than that he had followed approved medical practice in performing the operation and (2) that what is or is not proper medical practice can be established only by medical expert testimony, which, when not conflicting, is conclusive. Hence, he insisted that there was nothing in the record on which the trial court's finding of negligence could be based. The district court of appeal, however, held to the contrary. It relied for its decision on *Alcs v. Ryan*, 8 Cal. (2d) 82, 64 P. (2d) 409, in which the Supreme Court of California said:

... the failure to remove a sponge from the abdomen of a patient is negligence of the ordinary type and that it does not involve knowledge of *matéria medica* or surgery but that it belongs to that class of mental lapses which frequently occur in the usual routine of business and commerce, and in the multitude of commonplace affairs which come within the group of ordinary actionable negligence. . . . General negligence cannot be excused on the ground that others in the same locality practice the same kind of negligence.

The physician's testimony, continued the court, that he followed the usual and ordinary practice in performing the operation does not compel a finding that the inference of negligence arising from the fact that he failed to remove one of the sponges was rebutted. The question whether such inference has been rebutted is ordinarily for the determination of the trial court. The court again adverted to *Alcs v. Ryan*, supra, and noted that it quoted with approval from *Davis v. Kerr*, 239 Pa. 351, 86 A. 1007, 46 L. R. A. (N. S.) 611, as follows:

Here the surgeon had reached the conclusion that he had removed all the sponges—a mistaken conclusion, but verified by the nurses' count. In reaching his conclusion, did he exercise ordinary skill? We see nothing in the evidence to warrant the inference that he did not; but, on the other hand, we find nothing to warrant the inference that he did, which is far more important, since the burden of showing care was upon him. Why was a foreign substance left in the parts, which the operating surgeon should have removed? It was for him to acquit himself of negligence with respect to it. The sponge escaped his observation. Why? Was it so hidden and concealed that reasonable care on his part would not have disclosed it, or were conditions such that, in his professional judgment, further exploration by him for sponges would have endangered the safety of the patient? In a word, did he do all that reasonable care and skill would require? Except as one or the other of these questions

can be answered affirmatively from the evidence, the law will presume to the contrary, and attribute the unfortunate consequences to his contributing negligence.

But, continued the district court of appeal, in the instant case there was no evidence that the physician made any attempt by exploration in the patient's abdominal cavity to verify the sponge count which the nurses had announced as correct, nor was it shown that such exploration, if made, would have endangered the patient's safety. It did not appear that the sponge was so concealed that reasonable care on his part would not have disclosed it. On the contrary, the physician's own testimony lent strength to the inference of negligence arising from the application of the doctrine of *res ipsa loquitur*. His testimony was that the sponge which he had left in the patient's abdominal cavity was of the type used by him in every cesarean operation and was one which he used for the same purpose and placed in the same position in the abdominal cavity. It thus appeared that the sponge in question was of the ordinary type placed as a routine in the same position in every operation, and no compelling explanation was offered for his failure to remove it. The trial court was therefore justified in drawing the inference from the facts proved that the physician did not do all that reasonable care and skill would require.

The physician, continued the court, rested his case entirely on the testimony that in completing the operation as speedily as possible and in relying on the sponge count by the nurses he was following the usual and ordinary practice of other physicians in the same locality. But, a physician cannot relieve himself of liability by proof of a custom or practice among physicians requiring nurses to count the sponges used in an operation. The court concluded that, since the operation in question was performed under his immediate supervision and direction, the defendant physician was charged with the responsibility of determining that all sponges were removed from the field of operation before the incision was closed.

The judgment in favor of the patient and her husband accordingly was affirmed.—*Key et ux. v. Caldwell (Calif.)*, 104 P. (2d) 87.

Society Proceedings

COMING MEETINGS

- American Academy of Ophthalmology and Oto-Laryngology, Cleveland, Oct. 6-10. Dr. William P. Wherry, 107 South 17th St., Omaha, Secretary.
- American Academy of Pediatrics, Memphis, Tenn., Nov. 18-20. Dr. Clifford G. Grulee, 636 Church Street, Evanston, Ill., Secretary.
- American Clinical and Climatological Association, White Sulphur Springs, W. Va., Oct. 28-30. Dr. Francis M. Rackemann, 263 Beacon St., Boston, Secretary.
- American College of Surgeons, Chicago, Oct. 21-25. Dr. Frederic A. Besley, 40 East Erie St., Chicago, Secretary.
- American Public Health Association, Detroit, Oct. 8-11. Dr. Reginald M. Atwater, 50 West 50th St., New York, Executive Secretary.
- American Society of Anesthetists, New York, Oct. 10. Dr. Paul M. Wood, 745 Fifth Avenue, New York, Secretary.
- American Society of Tropical Medicine, Louisville, Ky., Nov. 12-15. Dr. E. Harold Hinman, Malaria Control Division, Wilson Dam, Ala., Secretary.
- Association of Military Surgeons of the United States, Cleveland, Oct. 10-12. Dr. H. L. Gilchrist, Army Medical Museum, Washington, D. C., Secretary.
- Central Society for Clinical Research, Chicago, Nov. 1-2. Dr. Carl V. Moore, Washington University School of Medicine, St. Louis, Secretary.
- Clinical Orthopaedic Society, Milwaukee and Madison, Wis., Oct. 18-19. Dr. Myron O. Henry, 825 Nicollet Ave., Minneapolis, Secretary.
- District of Columbia, Medical Society of the Washington, Oct. 15-17. Mr. Theodore Wiprud, 1718 M St., N.W., Washington, Secretary.
- Indiana State Medical Association, French Lick, Oct. 29-31. Mr. Thomas A. Hendricks, 23 East Ohio St., Indianapolis, Executive Secretary.
- Inter-State Postgraduate Medical Association of North America, Cleveland, Oct. 14-18. Dr. W. B. Peck, 27 East Stephenson St., Freeport, Ill., Managing Director.
- Nevada State Medical Association, Las Vegas, Oct. 11-12. Dr. Horace J. Brown, 120 North Virginia St., Reno, Secretary.
- New York State Association of Public Health Laboratories, Albany, Nov. 1. Miss Mary B. Kirkbride, New Scotland Avenue, Albany, Secretary.
- Omaha Mid-West Clinical Society, Omaha, Oct. 28-Nov. 1. Dr. J. D. McCarthy, 107 South 17th St., Omaha, Secretary.
- Pacific Coast Society of Obstetrics and Gynecology, San Francisco, Nov. 6-9. Dr. T. Floyd Bell, 400 Twenty-Ninth St., Oakland, Calif., Secretary.
- Southern Medical Association, Louisville, Ky., Nov. 12-15. Mr. C. P. Loran, Empire Bldg., Birmingham, Ala., Secretary.
- Loranz, Empire Bldg., Birmingham, Ala., Secretary.
- Southwestern Medical Association, Tucson, Ariz., Nov. 21-23. Dr. M. P. Spearman, 1001 First National Bank Bldg., El Paso, Texas, Secretary.
- Vermont State Medical Society, Rutland, Oct. 9-10. Dr. B. F. Cook, 154 Bellevue Ave., Rutland, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American J. Obstetrics and Gynecology, St. Louis

40:181-360 (Aug.) 1940. Partial Index

- Relation of Vitamin B₁ to Reproductive Cycle: Correlation Between Vitamin B₁ Content of Diet and Electrocardiographic Findings in Ninety-One Pregnant Women. P. F. Williams, G. C. Griffith and Florence G. Fralin, Philadelphia.—p. 181.
- Abdominal Pregnancy. C. B. Lull, Philadelphia.—p. 194.
- *Pregnandiol Determination as Aid in Clinical Diagnosis. C. L. Buxton, New York.—p. 202.
- Use of Sulfanilamide in Obstetrics and Gynecology: Report on 121 Cases. C. A. Gordon and A. H. Rosenthal, Brooklyn.—p. 211.
- Significance of Tuberculin Test in Pregnancy. E. C. Maeder and J. A. Myers, Minneapolis.—p. 218.
- Premature Elective Rupture of Membranes: Comparative Study. W. C. Keettel, A. W. Diddle and E. D. Plass, Iowa City.—p. 225.
- Correlation of Friedman Test and Phase of Endometrium in Ectopic Pregnancy. M. E. Goldblatt and H. A. Schwartz, New York.—p. 233.
- *Evaluation of Stilbestrol as Therapeutic Estrogen. U. J. Salmon, S. H. Geist and R. I. Walter, New York.—p. 243.
- Critical Analysis of Cesarean Section in Large Municipal Hospital. A. B. Tamis and M. D. Klein, New York.—p. 250.
- Mixed Adenocarcinoma and Squamous Cell Carcinoma of Uterus. I. C. Skinner and J. R. McDonald, Rochester, Minn.—p. 258.
- Pubiotomy in Impacted Mentum Posterior Presentation. W. P. Sharkey, Portland, Ore.—p. 267.
- Tubal Pregnancy Associated with Tubal Tuberculosis. P. B. Bland, Philadelphia.—p. 271.
- Relation of Obstetric Complications to Sterility. R. B. Nicholls, Norfolk, Va.—p. 276.
- Subarachnoid Injection of Alcohol for Treatment of Pain in Genital Carcinoma. F. L. Bauer, Iowa City.—p. 278.
- Bilateral Simultaneous Tubal Pregnancy. G. B. Lee and E. T. R. Stone, New York.—p. 316.
- Spontaneous Rupture of Spleen Complicating Labor. W. F. Shannon, Cincinnati.—p. 323.
- Tattooing (Puncturation) with Mercury Sulfide for Treatment of Intractable Pruritus Caused by Leukoplakia-Kraurosis Vulvae. R. Turell, New York.—p. 334.

Pregnandiol Determination as Aid in Clinical Diagnosis.—According to Buxton, the determination of the metabolism and excretion of progesterone, the corpus luteum hormone, has heretofore been impossible because there has been no accurate method for measurement of this substance either in the body or as an excretion product. The discovery of pregnandiol and its identification as an excretion product of progesterone has made it possible to determine the presence of progestational activity with a fair degree of accuracy. The metabolism of progesterone to sodium pregnandiol glucuronide in the body is a complex process. Pregnandiol determinations were done on four women during and following the injection of 30 mg. of progesterone daily for three days. Three of these patients had had a subtotal and one a total hysterectomy. Two of the patients excreted sodium pregnandiol glucuronide, whereas the other two did not. It has been found that men receiving injections of progesterone excrete large amounts of sodium pregnandiol glucuronide. The uterus, therefore, is not considered a necessary adjunct to this metabolic process. Its synthesis as sodium pregnandiol probably occurs in the liver. Since the metabolism of progesterone apparently involves a number of factors, an investigation was made of various laboratory animals. It was found that the urine of monkeys, cats and rabbits does not contain pregnandiol either normally, during pregnancy or after progesterone injections. The greatest yield and purest form of pregnandiol glucuronide occurs in the urine of pregnancy. No pregnant women have been observed who do not excrete pregnandiol glucuronide. Therefore negative diagnosis of pregnancy may be made from a negative pregnandiol determination. Pregnandiol is present in small amounts in the urine of normal women during the latter half of the menstrual cycle. Although

the excretion during pregnancy is greater than that during the luteal phase of the menstrual cycle, a diagnosis of pregnancy cannot be made on this basis because the quantitative determination is not sufficiently accurate. Five cases of habitual abortion were tested for pregnandiol excretion during subsequent pregnancies. One of these patients aborted spontaneously during the course of progesterone therapy. She showed unusually low pregnandiol excretion. Seventy-eight simultaneous pregnandiol determinations and endometrial biopsies were done on patients, most of whom were in the sterility clinic. These tests were done in order to ascertain the accuracy of these two methods of determining progestational activity. It is apparent that pregnandiol is excreted during the time that the endometrium is being activated to a secretory phase and only during that time. There are so many factors controlling the excretion of pregnandiol glucuronide that the quantitative result is liable to variation. Therefore diagnosis cannot be made on a basis of quantitative differences in excretion.

Evaluation of Stilbestrol as Therapeutic Estrogen.—According to Salmon and his associates, numerous clinical reports attested the fact that, in human beings, stilbestrol was capable of relieving menopausal symptoms. The authors studied the biologic and therapeutic effects of stilbestrol in forty-five cases. The investigations included the effect on the vaginal smear, vaginal mucosa and endometrium, the capacity of the substance to inhibit the excessive gonadotropic hormone excretion in the menopausal patient and its effectiveness in relieving the menopausal symptoms. The studies revealed that stilbestrol has an estrogen-like effect on the human vaginal mucous membrane and endometrium; that if sufficient stilbestrol is administered it appears to inhibit the excessive excretion of gonadotropic substance in the menopause. Stilbestrol relieves the hot flushes of the menopause but it does not impart to the patient the feeling of well-being and relief from nervous instability that usually result from treatment with the natural estrogens. Toxic symptoms were observed in 64 per cent of the forty-five patients. The toxic symptoms most commonly noted were nausea, vomiting and vertigo. The authors are of the opinion that the high incidence of toxic symptoms militates against the usefulness of stilbestrol as a therapeutic agent.

American Journal of Ophthalmology, St. Louis

23:853-970 (Aug.) 1940

- Concerning the Chamber Angle: I. Gonioscopy. H. S. Sugar, Chicago.—p. 853.
- Hyperuricemia and Inflammations of Eye. H. C. Kluever, Fort Dodge, Iowa.—p. 867.
- Historical Notes on Ophthalmoscopy. E. Jackson, Denver.—p. 873.
- Transplantation of Cornea by Means of a Mechanically Obtained Beveled-Edge Segment. M. Wiener and B. Y. Alvis, St. Louis.—p. 877.
- Projection Method of Presenting Test Object for Testing Visual Acuity. C. E. Ferree and G. Rand, Baltimore.—p. 882.
- Binocular Anomalies and Reading Ability. B. Clark, San Jose, Calif.—p. 885.
- Metastatic Carcinoma of Choroid with Primary Focus in Prostate Gland. M. M. Kulvin, Chicago.—p. 892.
- A Clinician's Experience with Sulfanilamide. B. Chance, Philadelphia.—p. 900.
- Some Interesting Muscle Cases with Comments. R. O'Connor, San Francisco.—p. 904.
- Blood Differential Count in Chronic Glaucoma. E. M. Blake and J. C. Leonard, New Haven, Conn.—p. 907.
- *Local Use of Sulfanilamide in Trachoma: Preliminary Report. K. W. Cosgrove, Little Rock, Ark.—p. 911.

Local Use of Sulfanilamide in Trachoma.—According to Cosgrove, 206 cases of trachoma have been diagnosed and treated by clinics held in the northwest and northern parts of Arkansas. The patients (ninety-seven) with no apparent physical disability which would contraindicate oral administration of sulfanilamide were given 20 grains (1.3 Gm.) of the drug daily to an adult male, 15 grains (1 Gm.) to an adult female and 10 grains (0.66 Gm.) to a child. In addition an 0.8 per cent solution of sulfanilamide was given to the patient to be dropped into the eyes from four to six times a day. The patients who were not considered good risks for oral treatment were given only the local treatment. Patients were instructed to cleanse the eyes with warm water every morning and evening. No other medication was used. All the patients reported a cessation of lacrimation and photophobia within the first three days. Sixty-three

patients who received oral medication were reexamined and questioned regarding undesirable symptoms. At least thirteen patients discontinued the oral medication, thus increasing the number of those who in reality received only local treatment. No discomfort was reported by these patients. Improvement in visual acuity among patients given oral and local medication indicates that 46 per cent had a visual acuity of 20/70 or better, and 19 per cent were improved to 20/30 or better. Of the patients who received only local treatment 62 per cent had a visual acuity of better than 20/70 and 31 per cent improved to 20/30 vision or better. The trachoma of the two groups of patients was similar; thus the greater percentage of improvement with local medication was not influenced by the stage of trachoma. It is probable that in a larger number of cases the percentages would have been more nearly equal. Thus the symptomatic relief of the patient with trachoma on local sulfanilamide is apparently as rapid and complete as that obtained from oral medication. The results also reveal that small doses of sulfanilamide supplemented by local application can be used in ambulatory clinics with the same results as are obtained from large doses. The author suggests that it may be possible to prevent the recurrence of trachoma after sulfanilamide therapy by its continued local use with no danger to the patient's health.

American Journal of Psychiatry, New York

97:1-254 (July) 1940

- Organization and Administration in Psychiatry. W. C. Sandy, Harrisburg, Pa.—p. 1.
- Study of 100 Patients Suffering from Psychosis with Cerebral Arteriosclerosis. H. E. Clow, White Plains, N. Y.—p. 16.
- Respiratory Response of Psychoneurotic Patients to Ideational and to Sensory Stimuli: Respiratory Response in Psychoneuroses. J. E. Finesinger and Sarah G. Mazick, Boston.—p. 27.
- Intracranial Tumors in Mental Hospital Patients: Statistical Study. C. P. Larson, Fort Steilacoom, Wash.—p. 49.
- Pharmacologic Shock Treatment of Schizophrenia: Statistical Study of Results in the Ohio State Hospitals. J. F. Bateman and N. Michael, Columbus, Ohio.—p. 59.
- Psychiatric Findings in Cases of 500 Traffic Offenders and Accident-Prone Drivers. L. S. Selling, Detroit.—p. 68.
- *Survey of Mental Illness Associated with Pregnancy and Childbirth. J. L. Smaldon, White Plains, N. Y.—p. 80.
- Dynamic Disturbances in the Handwriting of Psychotics, with Reference to Schizophrenic, Paranoid and Manic-Depressive Psychosis. Thea Stein Lewinson, New York.—p. 102.
- Treatment of Delirium Tremens with Insulin in Subshock Doses. G. W. Robinson Jr., Kansas City, Mo.—p. 136.
- Study of Insight of Psychiatric Patients. C. W. Osgood, Wauwatosa, Wis.—p. 152.
- Effect of 10 Mg. of Benzadrine Sulfate on Otis Test Scores of College Students. J. E. Barnack, New York.—p. 163.
- Prognostic Criteria in Dementia Paralytica. M. H. Greenhill and M. Yorshis, Worcester, Mass.—p. 167.
- Comparative Study of Thinking in Schizophrenic Children and in Children of Preschool Age. J. Louise Despert, New York.—p. 189.
- Set in Schizophrenic as Measured by Composite Reaction Time Index. E. H. Rodnick and D. Shakow, Worcester, Mass.—p. 214.

Psychoses in Pregnancy and Childbirth.—Smaldon studied the records of 220 women admitted to the New York Hospital, Westchester Division, because of mental illness associated with childbirth and the puerperium. These cases comprised roughly 8 per cent of the female admissions during the period (1922 to 1938) under study. This coincides with certain other published data. Williams has stated that only one in 1,000 women are so affected during pregnancy or childbirth. Manic-depressive psychoses accounted for 107 of the cases, dementia praecox for sixty-four, psychoneurosis for twenty-eight, psychosis with a psychopathic personality for ten, toxic-exhaustive psychosis for eight, a psychopathic personality with pathologic emotionality but without psychosis for two and a paranoid condition for one. Contrary to other reports, only 3.6 per cent of the cases were classified as deliriums directly attributed to the toxic-exhaustive factors of reproduction, although such factors were frequently precipitating causes in the development of rather typical manic-depressive reactions, particularly of the depressive type. Probably this difference in diagnosis may be attributed to the increasing recent tendency away from the belief that a specific psychosis occurs in the pregnant and postpartum states and toward the conception that the physical and psychic problems of childbirth do not determine the type of psychosis but merely act as exciting or precipitating agents. This is particularly attested by the fact that most of the toxic-exhaustive cases

were so diagnosed in the first half of the period under study. Further, a variance of many of the previously reported dynamic factors was found, emphasizing the difficulty of generalization regarding the mechanisms of these reactions. Undoubtedly the psychoanalytic explanations given of certain cases are quite correct but the author wonders whether one can postulate from these cases that other similar cases develop from a similar set of circumstances and by means of the same dynamics. It seems to him that each case of postpartum illness must be considered as an individual, nongeneralizable problem. His study does not corroborate the fact that a high proportion of the depressive type of manic-depressive psychoses and puerperal schizophrenias are of paranoid reaction. It rather shows a greater percentage of catatonia. The study corroborates the observations of Strecker and Ebaugh that these schizophrenic reactions frequently show pronounced manic-depressive symptoms, clouding of the sensorium and a tendency to remissions, that these cases tend to slow deterioration and that a high percentage of postpartum psychoses occur in the Jewish race. The slow deterioration may be due to the predominance of catatonic types rather than to a modification of the schizophrenic process by the reproductive process. The study shows a considerably greater morbidity in the heredity of the manic-depressive group than in the schizophrenic and toxic-exhaustive groups, and a still greater morbidity in the heredity of the psychoneurotic and psychosis with psychopathic personality groups. Many personality deviations were not observed. A high percentage of incest and homosexual ideas, considered by Zilboorg to be typical of puerperal depressive reactions, was not found. Likewise contrary to his claim a slightly greater number showed a mother preference. The study tends to corroborate to some degree Zilboorg's claim that the aloof, shy woman with little previous contact with men and prolonged courtship tends to develop puerperal schizophrenia. Antagonism toward the child, as expected from Zilboorg's hypothesis, was present. With few exceptions the psychoses did have their onset post partum. The schizophrenias reported by Zilboorg developed predominantly in multiparas, while those of the present series were slightly more frequent in primiparas. His assumption of the masculine role in the interval between pregnancies was lacking. A sense of guilt was found more frequently than by Zilboorg.

American Journal of Tropical Medicine, Baltimore

20:463-624 (July) 1940

- Rickettsia Diaporica and American Q Fever. H. R. Cox, Hamilton, Mont.—p. 463.
- Neurotropic Virus Isolated from Blood of Native of Uganda. K. C. Smithburn, T. P. Hughes, A. W. Burke and J. H. Paul, Entebbe, Uganda.—p. 471.
- *Results of Recent Studies of Hookworm in Eight Southern States. A. E. Keller, W. S. Leathers and P. M. Densen, Nashville, Tenn.—p. 493.
- Echinostoma lindoensis N. Sp., a New Parasite of Man in Celebes, with an Account of Its Life History and Epidemiology. J. H. Sandground, Indianapolis, and C. Bonne, Batavia, Java.—p. 511.
- Preliminary Report on Practical Epidemiology and Control of Endemic Typhus Fever in Georgia. C. D. Bowdoin and R. J. Boston, Atlanta, Ga.—p. 537.
- Falciparum Malaria in Drug Addicts: Clinical Aspects. H. Most, New York.—p. 551.
- Oviposition Experiments with Anopheline Mosquitoes. M. Bates.—p. 569.
- Comparative Evaluation of Paris Green and Pyrethrum Emulsion as Anopheline Larvicides in Georgia: Progress Report. J. M. Henderson and R. S. Howard Jr.—p. 585.
- Importance of Recognizing Secondary Vitamin Deficiencies. Susan Gower Smith, Durham, N. C.—p. 593.

Hookworm in Southern States.—Keller and his associates present data on the incidence of hookworm in the Southern states in which a plan of control was instituted by the Rockefeller Sanitary Commission in cooperation with the state departments of health. Hookworm surveys were made in eight Southern states during the periods 1910-1914 and 1930-1938. In the early period 577,590 specimens of feces were examined, and in the later period 424,511. The numbers found positive in the early and later periods were 240,895 and 81,913 respectively. After adjustment for the distribution of the population the percentage found positive in six of the eight states was 36.6 in the earlier period and 11.2 in the later period, resulting in a reduction of 68.3 per cent. In the later study the states in the order

of prevalence from highest to lowest were Mississippi, South Carolina, Alabama, North Carolina, Kentucky and Tennessee. While there is a widespread distribution of hookworm, the areas of highest incidence are confined to the coastal plain and sandy soil areas of each state. The age distribution shows that the greatest prevalence was in the group 5 to 19 years of age. The peak of incidence, 24.5 per cent, was reached in the age period 15 to 19. In preschool children and adults the incidence was about half as great as that found in the school age group. The distribution of all positive cases shows that about one fourth of the individuals had moderate, heavy or very heavy worm infestations sufficiently severe to produce clinical symptoms. The remainder of the cases were classified as very light or light infestations. The data analyzed with reference to household groups seemed to indicate that the individual worm burden tended to increase as the number of infested persons in the family increased. A comparison was made of hookworm in 17,458 Negroes and 59,028 white persons in the same counties during 1930-1938. The incidence in Negroes was about one fourth that in white individuals and the average intensity of infestation was about one half that found in white persons.

Annals of Surgery, Philadelphia

112:161-320 (Aug.) 1940

- Tumors of Islet Cells with Hyperinsulinism; Benign, Malignant and Questionable. V. K. Frantz, New York.—p. 161.
- Acute Pancreatitis and Diabetes. H. B. Shumacker Jr., Baltimore.—p. 177.
- *Indications for Lobectomy and Pneumonectomy in Pulmonary Tuberculosis. P. C. Samson, Oakland, Calif.—p. 201.
- Injections of Air and of Carbon Dioxide into Pulmonary Vein. R. M. Moore and C. W. Braselton Jr., Galveston, Texas.—p. 212.
- Conservative Electrosurgical Excision of Subesophageal, Chronic Penetrating or Acutely Perforated Gastric Ulcer: Report of Unusual Case Thus Treated—with Good End Results. R. H. Jackson, Madison, Wis.—p. 219.
- *Tuberculosis of Stomach: Clinical and Pathologic Study. R. C. Sullivan, N. T. Francona and J. D. Kirshbaum, Chicago.—p. 225.
- Ladd's Operation for Cure of Incomplete Rotation and Volvulus of Small Intestine Producing Duodenal Obstruction in Infancy. R. Elman, St. Louis.—p. 234.
- Plasma Transfusion in Experimental Intestinal Obstruction. J. Fine, Boston, and S. Gendel, Los Angeles.—p. 240.
- Metastatic Pulsating Tumor of Bone Secondary to Renal Carcinoma: Case Report. H. E. Shih and S. H. Wang, Peiping, China.—p. 249.
- Delayed Closure of Contaminated Wounds: Preliminary Report. F. A. Collier and W. L. Valk, Ann Arbor, Mich.—p. 256.
- Operative and Postoperative Infections, with Special Reference to Air-Borne Bacterial Contamination. W. Walters and T. B. Magath, Rochester, Minn.—p. 271.
- Wound Infection: Comparison of Silk and Catgut Sutures. D. C. Elkin, Atlanta, Ga.—p. 280.
- Graduate Teaching of Surgical Pathology. A. P. Stout, New York.—p. 284.

Indications for Lobectomy and Pneumonectomy for Tuberculosis.—Samson discusses indications and contraindications to lobectomy and pneumonectomy in tuberculosis and reports three instances of each. The appreciation of tuberculous bronchial stenosis with its resultant pulmonary atelectasis has followed the increasing use of the bronchoscope in cases of pulmonary tuberculosis. This type of case, which is not uncommon, refutes the belief that pulmonary atelectasis is a favorable prognostic sign in tuberculosis. Most of these patients cannot become entirely and permanently well without surgery. Indications for lobectomy differ from those for pneumonectomy. Stenosis of the lobar bronchus was not a factor in the three cases of lobectomy. The position of the cavity was important. Their presence in the lower and middle lobes indicated lobectomy and made the effectiveness of thoracoplasty doubtful. Pulmonary resection carries a greater risk than thoracoplasty. In cases in which thoracoplasty is not suitable and in those in which it has been performed without cure lobectomy may be indicated. The tuberculosis should be sharply limited to the portion of the lung to be resected. Lobectomy and pneumonectomy may be primary or secondary procedures. In the latter are those cases of pulmonary resection designed to remove cavity-bearing pulmonary tissue which has not been collapsed by a technically adequate thoracoplasty. The advisability of removing a lobe in which a cavity has not been collapsed by a pneumothorax is probably unwise without first obliterating the interpleural space by thoracoplasty. Planned pulmonary resection, not preceded by thora-

coplasty, may be listed as a primary procedure. Pneumonectomy should be considered for patients with total atelectasis of one lung and advanced fibrous stenosis of the stem bronchus who occasionally suffer from obstructive symptoms not relieved by bouginage of the stricture. Pneumonectomy probably should be deferred until mucosal healing and fibrostenosis have occurred in cases in which bronchial obstruction is due primarily to extensive ulcerative disease. A large isolated cavity in a lower or middle lobe is the first indication for primary lobectomy. The decision is strengthened by the presence of concomitant atelectasis and bronchiectasis or by a stenotic lobar bronchus. Obviously pneumothorax, phrenic paralysis and pneumoperitoneum, or a combination of these procedures, will have been tried prior to considering lobectomy. Repeated severe hemorrhages from a tuberculous cavity is a further indication.

Tuberculosis of Stomach.—According to Sullivan and his associates, from 1929 to 1938 in 11,480 consecutive necropsies performed at the Cook County Hospital there were 288 cases of pulmonary tuberculosis and in 242 additional cases pulmonary tuberculosis was found incidentally, death occurring from some other unrelated cause. There was one instance of tuberculosis of the stomach encountered in the former group of cases. In a third group of twenty-four cases in which a generalized tuberculous adenopathy was the primary cause of death, one case of tuberculosis of the stomach was present. Thus in 554 cases of tuberculosis the stomach was involved in two cases, while during the same time only one case was encountered in 75,000 surgical specimens. Pathologically, two types of tuberculosis of the stomach are to be discerned: 1. Miliary tuberculosis, in which the stomach contains single caseous tubercles which are located in the submucosa or on the serosa and are a part of the stage of generalization. 2. Ulcerative tuberculosis, which is characterized by numerous shallow, irregularly shaped ulcers with overhanging margins and grayish yellow bases, which rarely penetrate the muscular layer. They may eventually cause scarring and shrinking of the stomach, simulating syphilis or carcinoma. The sources of infection are thought to be direct invasion of the mucosa through the blood stream or lymph or by direct extension. Two of the cases were of the ulcerative type. The case of a 34 year old Negro with tuberculosis localized to the stomach and perigastric lymph nodes is described. Gastric resection has thus far completely eradicated the disease. Epithelioid cell tubercles were present in the gastric wall and in the perigastric lymph nodes. This type of case is of interest to the gastroenterologist and the surgeon in view of the diagnostic problem that it presents. The differential diagnosis usually considered is carcinoma or syphilis of the stomach, and tuberculosis is practically never included. Even the gross examination of the excised segment of the stomach resembles a malignant condition. The correct diagnosis is not suspected until microscopic examination is made. The prognosis is usually good following surgery in cases in which the general condition is fairly good and when there are no signs of active tuberculosis elsewhere in the body. The earliest symptoms are not characteristic. They are usually those of chronic gastritis with loss of appetite and a sense of fullness or pressure in the epigastrium. This is followed by epigastric distress or pain of the ulcer type, loss of weight and vomiting. The vomiting occurs late in the disease and the vomitus is dark or suggestive of gastric hemorrhage.

Archives of Otolaryngology, Chicago

32:195-416 (Aug.) 1940

- Innocuous Oils Useful in Rhinologic Practice, in Contrast to Liquid Petrolatum. F. J. Novak Jr., Chicago.—p. 195.
- Benign and Malignant Tumors of Jaw. F. R. Spencer, Boulder, Colo.; C. F. Hegner and W. C. Black, Denver.—p. 200.
- Role of Sulfanilamide in Treatment of Acute Otitis Media. J. W. Babcock, New York.—p. 246.
- Surgical Treatment and Its Complications in Cases of Acute Sinusitis. W. L. Simpson, Memphis, Tenn.—p. 250.
- Intradural Conditions in Relation to Rhinology and Otolaryngology: Critical Survey of Recent Literature. W. P. Eagleton, Newark, N. J.—p. 256.
- Teaching the Laryngectomized Patient to Talk (Without Aid of Mechanical Larynx). N. M. Levin, Philadelphia.—p. 299.
- Sarcoidosis of Larynx. D. L. Poe, New York.—p. 315.
- Treatment of Acute Laryngotracheobronchitis. F. W. Davison, Danville, Pa.—p. 321.
- Paranasal Sinuses. S. Salinger, Chicago.—p. 341.

Archives of Physical Therapy, Chicago

21:449-512 (Aug.) 1940

- Diathermy in Ophthalmology. A. D. Ruedemann and W. J. Zeiter, Cleveland.—p. 451.
 Orthopedic Gymnastic Treatment of Spinal Abnormalities. H. G. Hadley, Washington, D. C.—p. 455.
 Electrosurgery of Brain and Spinal Cord. J. G. Lyerly, Jacksonville, Fla.—p. 459.
 Colonic Irrigation: Indications and Technic. W. Cline, Miami, Fla.—p. 465.
 Simple Device for Forced Flexion of Knee. E. C. Elkins, Rochester, Minn.—p. 468.
 Esophageal Dysfunction Treated with Sinusoidal Current. M. J. Mandelbaum, New York.—p. 470.
 Roentgen Therapy in Otorhinology. M. S. Ersner, Philadelphia.—p. 477.
 Therapeutic Advances in Vasomotor Rhinitis and Bronchial Asthma. J. A. Haiman, New York.—p. 486.
 Detachment of Retina: End Results of Electrosurgical Treatment. H. S. McKeown, New York.—p. 489.

California and Western Medicine, San Francisco

53:53-104 (Aug.) 1940

- Gas Changes in Maternal and Fetal Blood During Cyclopropane Obstetric Anesthesia. E. A. Rovenstine, J. Adriani and W. E. Studdiford, New York.—p. 59.
 Amputation Through Lower Third of Femur: Modified Technic. C. E. Rees, San Diego.—p. 64.
 Dissecting Aneurysm. E. S. Kilgore, San Francisco.—p. 66.
 Some Aspects of Nutrition in Surgical Patients. I. S. Ravdin, Philadelphia.—p. 68.
 History of Anesthetic Department at Lane Stanford University Hospital in San Francisco. Adena C. Dutton, San Francisco.—p. 70.
 Early Care of Severe Thermal Injuries. H. McCorkle, San Francisco.—p. 72.
 *Obstetric Complications: Major Complications Encountered in 10,708 Obstetric Cases in the University of California Hospital. P. L. Martin, San Francisco.—p. 74.
 Discussion Groups as an Adjunct to Psychotherapy. M. R. Somers and Pearl S. Poupirt, San Francisco.—p. 79.

Obstetric Complications.—Martin studied the obstetric complications which occurred in 4,928 deliveries between 1916 and 1926 and the 5,780 encountered between 1927 and 1937. Pelvic contraction was found in only 187 cases, or 1.75 per cent of the total series. The problem of difficult labor is summarized as follows: The choice of a method of delivery for any given case is never complete without considering the pelvis, position, size of the baby, character of the pains and condition of the soft tissues. The risk to the mother and the child is significantly increased when one factor is unfavorable but is greatly increased when two or more factors are unfavorable. The incidence of cesarean operations in the 1927 to 1937 series of cases has doubled, yet there has been but one death in 278 cases, or 0.36 per cent. The aim is to deliver by low cesarean section women on whom high forceps was used formerly. Low or perineal forceps were used in 8.7 per cent of the total material. No insignificant increase in morbidity, mortality or fetal mortality was associated with this procedure. Mid forceps is limited to compelling indications, usually maternal. High forceps performed in the first series was attended with a 7.4 maternal and a 38 per cent fetal mortality. The incidence of mid forceps has changed but little and still is attended with a high fetal mortality. Delivery by version and extraction has been used in only thirty-eight of the 10,708 cases, and then only when indications for immediate delivery were compelling. Two maternal deaths followed, both in relatively desperate cases. An incidence of 3.48 per cent, or 368 breech deliveries, was conducted without maternal mortality but with an uncorrected gross fetal mortality of 12.3 per cent. All antenatal fetal deaths, macerated fetuses and neonatal deaths due to prematurity were included in this percentage. Toxemia of pregnancy developed in 481, or 4.5 per cent, of the total patients; a hypertension of more than 150/100, along with varying degrees of albuminuria and edema, was present. There were thirty-three other cases of convulsive toxemia or eclampsia. There were four maternal and thirty-seven fetal deaths among the 481 nonconvulsive toxemias. There were no maternal deaths and five fetal deaths among the eclamptic patients. All the fetal deaths were of premature infants. One hundred and twenty-two patients of the total series had complicating organic heart disease and were allowed to reach the stage of viability. There were six maternal deaths, or 4.9 per cent mortality. Twenty-four other women were considered too poor risks from the cardiac standpoint and their pregnancies were terminated by therapeutic abortion. Sixteen of the 122 became decompensated during late pregnancy and

the six maternal deaths occurred among the decompensated cases. Since 1928 such patients have been followed both by a cardiologist and by an obstetrician and the mortality rate has been strikingly reduced; but one death has occurred since 1928. Pregnancy was complicated by diabetes mellitus in twenty-one cases. One maternal death occurred in the preinsulin days, a patient with severe diabetes who died undelivered of a premature infant while in diabetic coma. There were four fetal deaths. Fibroids have not been a particularly serious complication, as there were few cases with large fibroids. An estimated postpartum blood loss of 600 or more cubic centimeters has been recorded in 230 cases. Ninety-eight of the hemorrhages followed an operative delivery. The exact cause of antenatal bleeding was difficult to determine. However, in sixty-seven cases it was of significant amount and was definitely due to premature separation of a normally implanted placenta and in forty it was due to placenta praevia. Among these 107 cases, twenty cesarean sections were performed. In recent years no manipulations or vaginal examinations were carried out in such cases until cross-matched donors were available and preparations for immediate laparotomy were complete. Probably as a result of such precaution and other improvements in postoperative care there has been but one maternal death in the 1927 to 1937 series. There were six deaths during the 1916 to 1926 series. The author points out that conservatism in obstetric management remains the policy of choice, as is evidenced by the 0.21 per cent uncorrected maternal mortality and the 3.6 per cent uncorrected and 1.8 per cent corrected fetal mortality obtained in the 5,780 deliveries seen between 1927 and 1937.

Canadian Medical Association Journal, Montreal

43:99-200 (Aug.) 1940

- *Experience with Pfeiffer Crystallization Method for Diagnosis of Cancer. O. C. Gruner, Montreal.—p. 99.
 Treatment of Infiltrating Tumors of Bladder. R. Pearse and R. A. McComb, Toronto.—p. 106.
 Recurrent Subarachnoid Hemorrhage Due to Arterial Angioma of Cerebellum and Brain Stem. J. C. Richardson and A. W. Bagnall, Toronto.—p. 111.
 Abdominal Aortic Mycotic Dissecting Aneurysm. S. W. Lippincott, Montreal.—p. 115.
 Primary Carcinoma of Fallopian Tube. H. A. Baron, Montreal.—p. 118.
 Traveling Clinics in Manitoba. A. L. Paine, Ninette.—p. 122.
 Corrosion of Metals in Tissues and Introduction to Tantalum. G. L. Burke, Vancouver, B. C.—p. 125.
 Effect of Olive Oil and Cod Liver Oil on Gastric Secretion in Dog. Olga Komarov and S. A. Komarov, Montreal.—p. 129.
 Progressive Postoperative Gangrene of Skin. I. H. Brodie and C. Bouck, Calgary, Alta.—p. 133.
 Genetic Research in Medical Practice. D. de F. Bauer, Montreal.—p. 135.
 Allergy in Children. G. Chown, Winnipeg, Man.—p. 141.
 Sonne Dysentery In and Around Vancouver. R. Wilson, Vancouver, B. C.—p. 144.
 Injury of Urethra in Male Child. R. M. Wansbrough, Toronto.—p. 147.
 Colles' Fracture. A. W. M. White, Toronto.—p. 148.
 Brill's Disease: Case. J. E. Nichol, Toronto.—p. 151.
 Fracture of First Metacarpal Bone. E. S. James and A. Gibson, Winnipeg, Man.—p. 153.
 Tetania Parathyroprivia: Report of Case. H. H. McGarry, Niagara Falls, Ont.—p. 155.
 Treatment of Convulsions with Dilantin Sodium. W. A. Hawke, Toronto.—p. 157.
 Appendix Vermiformis Duplex. D. E. Robertson, Toronto.—p. 159.
 Pathology of Dissecting Room. C. R. Salisbury, Kingston, Ont.—p. 161.
 Note on Histamine. C. H. Best and E. W. McHenry, Toronto.—p. 163.

Pfeiffer's Crystallization Method for Diagnosis of Cancer.—Gruner points out that the patterns which crystals assume after the addition of blood to a solution of cupric chloride have been claimed by E. Pfeiffer to be distinctive between health and disease. The pattern characteristic for cancer has been defined by Pfeiffer as built up on a straight line to the center of which impinge a few lines at angles varying from 5 to 30 degrees. Lines at similar angles may meet at the same point from the opposite side of the base line. The two groups of lines together give an appearance recalling that of tyrosine crystals seen under the microscope. The more numerous and the better defined the groupings in a plate, the more advanced is the case considered to be. The fact that cancerous blood really produces differences which are uniform in kind is readily established even with a few dozen tests. The author performed the crystallization on 122 patients in whom the existence of cancer had been proved, on twenty

cancer patients who had been treated, on thirty-three patients without cancer and on a considerable number of normal and tumor-bearing animals. In Pfeiffer's technic one drop of blood is allowed to fall directly from a finger prick into 1 cc. of distilled water. After thirty minutes two drops (0.1 cc.) of this are introduced into 10 cc. of a 20 per cent cupric chloride. After one-half minute the mixture is poured out on specially prepared plates resting in a specially constructed chamber, and the readings are made after eighteen hours. The only innovation which Gruner has made has been the use of polarized light for reading the slides. The results of the crystallizations done with material obtained from the Royal Victoria Hospital in Montreal are recorded in tables which reveal that the crystallization method gave positive results in 110 of the 122 proved cancer patients; the readings were correct in 90.1 per cent of the cancer cases. In the thirty-three patients without cancer, one positive result was obtained; the percentage of correctness was 96.9 per cent. A positive crystallization test may become negative after excision of the cancer or after treatment by radium. Of the twenty treated cases tested by the author, eleven (55 per cent) were negative. Of animals, those which showed spontaneous tumors or had received grafts showed a positive picture in 79 per cent. Eighteen of twenty-two animals in which the graft did not take gave a negative picture. Eight normal animals of forty-five gave a positive picture and these were mice belonging to a cancer-susceptible strain. A positive crystallization need not necessarily be dismissed as wrong, because the clinician cannot find the tumor. On the contrary, if the test is repeatedly positive the patient should be watched carefully.

Endocrinology, Los Angeles

27:161-344 (Aug.) 1940. Partial Index

- Review of Experimental and Clinical Trials of Stilbestrol. Dorothy W. Atkinson, San Francisco.—p. 161.
Problem of Hormone Distribution as Controlled by Tissue Uptake. R. Kurzrok and L. Wilson, New York.—p. 166.
Urinary Excretion of Pregnanediol Complex by Males. E. C. Hamblen, W. K. Cuyler and D. V. Hirst, Durham, N. C.—p. 169.
Effect of Testosterone Propionate on Skeletal Development of a Eunuch. I. Rapfogel, New York.—p. 179.
Diagnostic Significance of Cranial Roentgenograms in Pituitary Disease. M. A. Goldzieher, New York.—p. 185.
Diabetes Insipidus of Over Twenty Years' Standing Improved Following Subarachnoid Hemorrhage. S. A. Loewenberg and N. G. Sloane, Philadelphia.—p. 191.
Spontaneous Hypoglycemia in Simmonds' Disease. E. Mogensen, Copenhagen, Denmark.—p. 194.
Epilepsy Complicated by Uncontrollable Diabetes Mellitus. A. T. Ross and W. W. Dickerson, Wahjamega, Mich.—p. 200.
Effects of Hypophyseal Stalk Resection on Hypophysis and Hypothalamus of Man. A. T. Rasmussen, Minneapolis, and W. J. Gardner, Cleveland.—p. 219.
Cyclic Changes in Exteriorized Uterus. G. Van Wagenen and A. H. Morse, New Haven, Conn.—p. 268.
Experimental Superfecundity with Pituitary Gonadotropins. H. M. Evans and Miriam E. Simpson, Berkeley, Calif.—p. 305.
Sugar Utilization of Hypophysectomized Rabbits. P. O. Greeley, Los Angeles.—p. 317.
Effect of Anterior Pituitary-like Sex Hormone and Castration on Experimental Tuberculosis. C. B. Brack and L. A. Gray.—p. 322.
Influence of Growth Promoting Hormone of Anterior Lobe of Pituitary on Growth Activity in Long Bones of Rat. Evelyn S. Ross and F. C. McLean, Chicago.—p. 329.

Illinois Medical Journal, Chicago

78:97-192 (Aug.) 1940. Partial Index

- Role of Kidney in Cardiovascular-Renal Disease. L. G. Rowntree, Philadelphia.—p. 109.
Socialized Medicine. R. C. Berry, Livingston.—p. 128.
Varicose Veins. A. M. Vaughn, Chicago.—p. 137.
Use of Bee Venom in Treatment of Neuritis and Arthritis. B. E. Montgomery, Harrisburg.—p. 148.
Constipation. M. G. Spiesman, Chicago.—p. 153.
Deleterious Effects of Sulfanilamide and Sulfapyridine: Case Report of Agranulocytosis. L. T. Hoyt, Roseville.—p. 161.
Tuberculosis: Home Treatment. H. G. Horstman, Murphysboro.—p. 166.
Peritonissilar Edema in Diphtheria: Danger of Incision. W. M. Youngerman, Champaign.—p. 169.
Trachoma and Follicular Conjunctivitis. M. Hirschfelder, Harrisburg.—p. 171.
An Eye for a Tooth or a Tooth for an Eye. J. E. Lebensohn, Chicago.—p. 174.
Management of Gastrointestinal Disease in Pulmonary Tuberculosis. E. F. Traut, Oak Park.—p. 176.
Treatment of Gonorrhea with New Sulfanilamide Derivative. G. C. Hunt, Springfield.—p. 183.

Journal of Lab. and Clinical Medicine, St. Louis

25:1125-1234 (Aug.) 1940

- Experimental Study of Effects of Sulfapyridine on Staphylococci and Staphylococcus Toxin. R. H. Rigdon and P. R. Freeman, Memphis, Tenn.—p. 1125.
Action of Digitaloid Glucosides on Vasomotor Center. P. Blickensdorfer and H. A. McGuigan, Chicago.—p. 1134.
*Quantitative Prothrombin and Hippuric Acid Determinations as Sensitive Reflectors of Liver Damage in Human Subjects. S. J. Wilson, Columbus, Ohio.—p. 1139.
Review of Advances in Study of Auricular Disorders. A. Luisada, Boston.—p. 1146.
Micromethod for Determination of Tissue Lipids. E. L. Outhouse and J. C. Forbes, Richmond, Va.—p. 1157.
Fatal Reactions to Administration of Sulfonamide Drugs: Report of Five Cases. L. J. Tragerman and J. M. Goto, Los Angeles.—p. 1163.
Nutrition and Nervous Excitability. L. Marks and H. Necheles, Chicago.—p. 1177.
Intravenous Administration of Sucrose Solutions as Means of Producing Intense Diuresis. H. F. Helmholz and J. L. Bollman, Rochester, Minn.—p. 1180.
Interrelation Between Vitamin B Complex and Anterior Lobe of Pituitary Gland. D. C. Sutton and J. Ashworth, Chicago.—p. 1188.

Tests for Hepatic Damage.—Wilson found that in forty-one patients without obstructive jaundice or biliary fistulas the quantitative level of the plasma prothrombin correlated closely with the quantity of hippuric acid excreted. In addition to normal individuals the study included persons with cirrhosis of the liver, Banti's syndrome, familial hemolytic icterus, pernicious anemia, aplastic anemia, multiple myeloma, polycythemia vera, Hodgkin's disease and leukemia of all types with various degrees of hepatic infiltration. Among those individuals with proved hepatic damage in which the hippuric acid excretion was between 0.86 and 2 Gm. the prothrombin was found to be between 19 and 37 per cent of normal; with from 2 to 3.9 Gm. of hippuric acid excretion the prothrombin level was between 33 and 90 per cent of normal, and with from 3.9 to 4.56 Gm. of hippuric acid excretion the prothrombin level was between 70 and 100 per cent of normal. No consistent correlation was noticed between plasma prothrombin and plasma fibrinogen, particularly when an infectious process was present. The galactose tolerance test was within normal limits in all patients studied. There was a wide variation in the results recorded for the bromsulphalein dye test. There was a definite correlation between the level of the plasma prothrombin and the synthesis and excretion of hippuric acid following the ingestion of sodium benzoate as measured by the method of Quick. Confirmation at operation and necropsy has shown that these two tests are sensitive reflectors of hepatic damage. A relatively extensive degree of damage to the parenchymatous tissue of the liver must be present before it is reflected in many of the commonly used hepatic function tests. The ability of the liver to form prothrombin from vitamin K and to synthesize hippuric acid from sodium benzoate is a more sensitive measure of the amount of hepatic damage present than the majority of hepatic function tests would indicate. Prothrombin cannot be replaced by blood transfusion in sufficient quantity to be of any therapeutic value.

Kansas Medical Society Journal, Topeka

41:321-364 (Aug.) 1940

- Treatment of Peptic Ulcer. W. L. Palmer, Chicago.—p. 321.
Value of Determination of Basal Metabolic Rate to the General Practitioner. W. H. Olmsted, St. Louis.—p. 325.
Erysipeloid: Report of Thirteen Cases Among Veterinary Students at Kansas State College. H. T. Gross, Manhattan.—p. 329.
*Appendicitis with Complete Situs Inversus Viscerum. C. W. Lawrence, Emporia.—p. 333.
Acute Ascending Paralysis (Landry's Paralysis). R. L. Drake, Wichita.—p. 335.
Cinchophen Poisoning. M. G. Berry, Kansas City, Mo.—p. 337.
Sacralization of Coccyx. H. G. Hadley, Washington, D. C.—p. 339.

Appendicitis with Complete Situs Inversus Viscerum.—Lawrence cites a case of appendix located on the left side with complete transposition of the thoracic and abdominal viscera, diagnosed by physical examination and confirmed by x-ray study, the electrocardiograph and at operation. This anomaly was first recorded in the seventeenth century, four cases being reported. Many cases are probably not diagnosed, as it is said to occur once in every 5,000 necropsies. Up to 1924, 270 cases had been reported. The anomaly occurs more often in males than in females. In many instances there is a dextrocardia while the other viscera are in their normal position. A complete situs inversus of the viscera is compatible with health and longevity

and except as an anatomic curiosity is important only to the embryologist, cardiologist and surgeon. However, a partial transposition is often troublesome as it may interfere with the function of some parts due to malposition in relation to other organs. A clinical picture of an abdominal lesion except as to location of pain and point of sensitivity should be a warning and the diagnosis should be cleared up by a fluoroscopic examination of the chest, a barium sulfate meal and an enema. The subject is of much importance in abdominal surgery for, as Pol pointed out, more than half of forty-six patients with left side appendix complained of pain in the right lower abdomen, referred pain. Usually pain produced by an irritated abdominal viscus is first referred to the epigastrium and later to the viscus involved or to the opposite side from the viscus involved. The electrocardiograph will clear up the diagnosis of a case of dextrocardia, as lead 1 will be inverted and leads 2 and 3 will be transposed. X-ray study is necessary in diagnosing transposition of the abdominal viscera. The author's patient was a girl of 19 who had been complaining of pain in the right lower part of the abdomen for twelve hours. She had a similar attack one year previously. The maximal cardiac impulse was found in the fifth intercostal space in the right side of the chest. There was rigidity in both the right and the left iliac fossa, but the patient insisted that the pain was mostly in the right side except on deep pressure, when it was more intense on the left. At operation a right rectus incision was made and the sigmoid was found in the right iliac fossa and the cecum in the left fossa. The appendix was delivered without much difficulty, the abdomen was closed and recovery was uneventful.

Medical Annals of District of Columbia, Washington 9:261-290 (Aug.) 1940

- Some Remarks on Diagnosis and Treatment of Pulmonary Tuberculosis. J. N. Hayes, Saranac Lake, N. Y.—p. 261.
Chronic Otorrhea. J. N. Novick, Washington.—p. 267.
Hypertensive Heart Disease in White and Colored Women: Comparison of Necropsy Data in the District of Columbia. Thelma B. Dunn, Washington.—p. 271.
Rest and Protection Treatment of Anterior Poliomyelitis. M. C. Cobey, Washington.—p. 275.
General Principles of Laboratory Procedure in Cases Presenting Albuminuria. H. E. Ragle, Washington.—p. 277.

New York State Journal of Medicine, New York 40:1205-1274 (Aug. 15) 1940

- Malignant Kidney Tumors: Study of Cases at the Rochester General Hospital During a Twelve Year Period. I. A. Gáspár, Rochester.—p. 1209.
Jaundice. H. G. Jacobi, New York.—p. 1218.
Operative Treatment of Cataract Other Than the Senile Type. T. LeWin, Buffalo.—p. 1228.
Streptococcal Pneumonia. E. A. Lawrence and W. D. Sutliff, New York.—p. 1233.
Agranulocytosis Forme Fruste. W. Pewny, Bratislava, Czechoslovakia.—p. 1236.
Epidemics of Diarrhea in the Newborn. W. D. Ludlum, Brooklyn.—p. 1238.
Rheumatic Heart Disease in Pregnant Women: Treatment in City Hospital. J. Clahr, M. D. Klein and N. M. Greenstein, New York.—p. 1242.
Treatment of Diabetes Mellitus in Patients in the Older Age Group. M. B. Handelsman and J. K. Bradford, Brooklyn.—p. 1248.

Ohio State Medical Journal, Columbus 36:817-920 (Aug.) 1940

- Intestinal Obstruction in Newborn Due to Congenital Anomalies. D. M. Glover and C. A. Hamann, Cleveland.—p. 833.
Primary Sarcoma of Ileum with Perforation: Case Report. C. F. Frankman, Greenville, and D. H. Drummond, Brooklyn.—p. 841.
Use of Hormones in Cryptorchism. C. E. Zeithaml, Cleveland.—p. 843.
Adrenalin in Oil: Results When Used as Inhalation and Intratracheal Injection. A. E. Cohen, Louisville, Ky.—p. 846.
Dynamic Conception of Psychopathic Personality. M. Levine, Cincinnati.—p. 848.
Laryngotracheobronchial Obstructions and Their Secondary Effects. T. C. Galloway, Evanston, Ill.—p. 851.
Diabetes Mellitus. F. Anzinger Jr., Springfield.—p. 855.
Acute Surgical Diseases of Abdomen in Children. M. T. Hoerner, Dayton.—p. 859.
Infantile Paralysis. C. W. Burhans, Lakewood.—p. 865.
Pharmacologic Shock Therapy: Recent Studies Presented at the Meeting of the American Psychiatric Association. J. L. Fetterman, Cleveland.—p. 868.
Pyelonephritis: Case Presenting Clinical Problems. H. L. Rinehart, Columbus.—p. 870.

Oklahoma State Medical Assn. Journal, Oklahoma City 33:1-58 (Aug.) 1940

- Local Treatment of Nasal Allergy. O. A. Watson, Oklahoma City.—p. 1.
Exstrophy of Bladder: Experimental and Clinical Study of Cases. G. H. Kimball and N. R. Drummond, Oklahoma City.—p. 2.
Diagnosis and Treatment of Malaria. W. L. Shippey, Poteau.—p. 8.
Treatment of Trachoma. J. H. Hammond, Tulsa.—p. 12.
Rheumatic Fever: Types, Diagnosis and Treatment. C. J. Roberts, Enid.—p. 15.
Tinea Capitis. J. B. Hix, Altus.—p. 18.

Pennsylvania Medical Journal, Harrisburg 43:1521-1664 (Aug.) 1940

- *Nutritional Disturbances in Relation to Skin Diseases. G. C. Andrews, New York.—p. 1535.
Practical Aspects of Stereoscopic Roentgen Ray Pelvimetry: Report of 125 Cases. R. E. Tafel, Pittsburgh.—p. 1541.
Oxygen Therapy. P. A. Faix, Pittsburgh.—p. 1545.
Changing Trends in Treatment of Some Common Disorders of the Preschool-Age Child. Emily P. Bacon, Philadelphia.—p. 1549.
Problem of Multiple Pregnancy. J. C. Hirst, Philadelphia.—p. 1553.
Clinical Interpretation of Leukocytic Pictures. M. M. Strumia, Penn Valley.—p. 1556.
Perirenal and Perinephric Infections. C. N. Haines, Sayre.—p. 1561.
Carbuncle or Solitary Abscess of Kidney. W. L. Estes Jr., Bethlehem.—p. 1566.
Unusual Sites of Metastasis from Carcinoma of Rectum and Sigmoid Colon. H. E. Bacon, Philadelphia.—p. 1573.
Diabetes: IV. Education of the Diabetic Patient. Anna O. Stephens, Laurelton.—p. 1579.
Human Sterility: Analysis of Series of 400 Specimens of Spermatic Fluid. R. H. McClellan, Pittsburgh.—p. 1582.
Vertex Occipitoposterior Positions. R. A. D. Gillis, Pittsburgh.—p. 1586.
Field Changes in Intracranial Tumors. C. R. Heed, Philadelphia.—p. 1592.

Nutritional Disturbances and Cutaneous Diseases.—In addition to well recognized deficiency syndromes there are, according to Andrews, a variety of abnormal conditions of the skin and mucous membranes in which the vitamin B complex is an important factor. The action of nicotinic acid and riboflavin on oral lesions is sufficient to suggest its use more widely and perhaps as a routine prior to operation in cases in which other oral lesions are associated with carcinoma of the tongue or buccal cavity. Whereas the results of treatment are not absolutely conclusive there is a strong suggestion that certain cases of oral leukoplakia are manifestations of a deficiency of some fraction of the vitamin B complex. Also some cases of neurodermatitis may have a nutritional background, and photosensitization may in some cases be a manifestation of vitamin deficiency. There are thirty-six (Spies) known dietary constituents essential to adequate nutrition. Little is understood concerning the body's requirements for some of these factors, and even less is known of the interrelationship of these substances to metabolism. The diet is influenced by the age, race, habits, taste and economic status of the patient. In general, however, treatment of deficiency states should include a diversified diet of from 4,000 to 4,500 calories, be rich in meat, liver, eggs and milk, and be supplemented by dry brewers' yeast and some of the fish oils.

Rhode Island Medical Journal, Providence 23:129-144 (Aug.) 1940

- Recent Concepts of Convulsive Disorders. C. P. Fitzpatrick, Howard.—p. 129.
Delirium as Danger Signal. I. C. Nichols, Providence.—p. 132.
Early Medical History of Kent County, Rhode Island: J. H. Eldredge, President of the Rhode Island Medical Society, 1858-1860. H. DeWolf, Providence.—p. 135.

South Carolina Medical Assn. Journal, Greenville 36:211-240 (Aug.) 1940

- Modern Conception and Treatment of Prenatal Syphilis. J. J. Kane, Beaufort.—p. 211.
Injuries of Pleura and Lung. E. F. Parker, Charleston.—p. 219.
Male Climacteric. W. R. Mead and R. Stith, Florence.—p. 222.

Tennessee State Medical Assn. Journal, Nashville 33:289-332 (Aug.) 1940

- Mode of Action of Sulfanilamide. M. T. Bush, Nashville.—p. 294.
Sulfanilamide and Its Compounds: Their Uses in Medicine. J. O. Manier, Nashville.—p. 296.
Sulfanilamide in Surgery. M. J. Tendler, Memphis.—p. 300.
Toxic Manifestations of Sulfanilamide and Allied Drugs. F. E. Marsh, Chattanooga.—p. 305.
Gastritis. J. Witherspoon, Nashville.—p. 309.

Western J. Surg., Obst. & Gynecology, Portland, Ore.
48:469-536 (Aug.) 1940

- *Appendicitis with Complications: Reduction in Mortality Due to Use of Continuous Gastrointestinal Decompression. R. Ward, San Francisco.—p. 469.
- Tumors in Infants and Children: Conservative Surgical Therapy. C. W. Brunkow, Portland, Ore.—p. 480.
- Management of Surgical Injuries to Ureter. A. B. Hepler, Seattle.—p. 486.
- *Prostigmine in Treatment of Ureteral Stones. A. J. Scholl, Los Angeles.—p. 493.
- Endometriosis of Umbilicus. H. S. Chapman, Stockton, Calif.—p. 496.
- Carcinoma of Breast. A. A. Matthews, Spokane, Wash.—p. 502.
- Team Work in the Care of the Surgical Patient. I. Wills and A. H. Elliot, Santa Barbara, Calif.—p. 508.
- Traumatic False Sacular Aneurysm Resulting from Erosion of Femoral Artery in Patient with Hereditary Deforming Chondrodysplasia. E. Butler and M. W. Debenham, San Francisco.—p. 511.
- Fecal Fistula Following Appendicitis: Report of Eighteen Hospital Cases and Nineteen Cases from Literature. A. N. Collins, Duluth, Minn.—p. 514.
- *Thyroid Surgery in Cardiac Disease. J. deJ. Pemberton and J. M. Miller, Rochester, Minn.—p. 518.
- Technical Problems in Surgical Management of Large Cervical and Intrathoracic Goiter. C. J. Hunt, Kansas City, Mo.—p. 524.

Appendicitis with Complications.—Ward points out that the reduction in mortality following continuous gastrointestinal decompression was not great but that it indicated ways of still further improving the results. At the University of California Hospital 206 patients with acute appendicitis were operated on from 1913 to 1925 and 561 from 1925 to 1939. During the latter period decompression was known, but unfortunately not always used. The reduction in mortality was from 5.8 to 3 per cent and an analysis of the causes of death suggests that transduodenal decompression was the most important factor in this reduction. In a group of seventy-two patients with gangrenous, not perforated, appendixes there were no deaths. In the cases in which perforation with local peritonitis had taken place the mortality was reduced from 14.3 per cent in the early period to 5 per cent in the later period. In perforation with diffuse peritonitis the mortality decreased from 40 per cent in the early period to 27.2 per cent in the later period. In cases of abscess in which drainage only was carried out there has been no change in the mortality rate, while for those in whom abscess was treated by drainage and appendectomy the mortality rate doubled. However, two of these deaths were probably unpreventable under any plan of treatment and if they are eliminated the mortality rate would be identical for the two periods. In 41 per cent of the deaths there was a history of the use of cathartics and more than half of the patients had been sick longer than four days before being sent to the hospital. The author believes that only five of the twenty-nine deaths could not have been prevented by any plan of management and that some change in handling might have eliminated twenty-four deaths. The plan of management that he suggests is as follows: 1. Operation for appendicitis should be performed when the diagnosis is made or strongly suspected, except in the presence of diffuse peritonitis, if rigidity has given way to flaccid distention or if the patient is moribund. Such patients are to be treated with immediate intestinal decompression by nasal tube, restoration of fluid and electrolytic balance, use of the Fowler position and morphine. 2. Under spinal anesthesia, or occasionally local anesthesia, reinforced by pentothal sodium or evipal soluble administered intravenously, the appendix should be approached through a gridiron incision over its suspected site and removed with the cautery under adequate exposure with continuous suction evacuation of pus or serous fluid and with a minimal disturbance of the surrounding structures. The stump should be closed by simple ligation or inversion without ligation if the cecal wall is not indurated and the abdominal cavity without drainage, unless a well walled-off abscess has been found. 3. The abdominal wall should be drained adequately in the infected cases or the wound packed with petrolatum gauze if greatly contaminated. 4. Post-operatively, intestinal decompression should be instituted without waiting for distention. Comfort and intestinal tone should be maintained by morphine, fluid and electrolytic balance according to the plan laid down by Collier, and fluids and food by mouth should be withheld until peristalsis has returned without the use of artificial stimulants. 5. An aerobic and anaerobic culture should be obtained at the time of operation for guidance in

specific postoperative therapy. As a test of the plan the author says that in his last hundred personal cases in which he followed these rules there have been two deaths. Both patients were inmates of a home for the aged and their necropsy reports read like a catalogue of diseases of mankind and included everything from syphilis to coronary occlusion. Both had a gangrenous perforated appendix and he thinks that death was inevitable.

Prostigmine for Ureteral Stones.—Scholl suggests that one or two series of injections of prostigmine methylsulfate be given every patient with ureteral stones before any manipulative or surgical measures are instituted. He used the drug in fifteen personally observed cases, and in seven it was of definite help. In all except three cases, in which small stones were present in the lower ureter, some other procedure was also used; usually the passage of a soft ureteral catheter up to or by the stone in an effort to establish the diagnosis. In none of the fifteen cases were stone dislodgers, metal dilators or multiple catheters used. In the three cases with small stones, the stones were passed promptly after the first prostigmine injections. Hager's original recommendation of dosage is still the most satisfactory.

Thyroid Surgery in Cardiac Disease.—Pemberton and Miller believe that for a complete conception of cardiac physiology in relation to the hyperthyroid states the condition must be thought of in terms of altered, increased metabolism. A certain degree of cardiovascular disturbance is almost invariably associated with thyrotoxicosis. Thus in such cases the clinical signs related to the cardiovascular system are easily explicable on the basis of an increased circulatory rate. The latter is merely the result of the changes in the body economy dictated by an increased metabolic rate. The most common disorder of cardiac rhythm is auricular fibrillation. Its persistence following thyroidectomy is suggestive of the presence of associated primary cardiac disease, residual cardiac injury from protracted hyperthyroidism or recurrent hyperthyroidism of exophthalmic goiter. Most of these patients are prepared for operation in about two weeks and are not hospitalized unless congestive failure is present. Patients suffering from congestive heart failure should have rest and be treated for primary cardiac disease without hyperthyroidism. When compensation is attained the patient should be ambulatory in a limited fashion for several days. Debilitation from prolonged rest and the ravages of hyperthyroidism make him susceptible to postoperative pulmonary complications. This period of limited activity also affords a test of cardiac reserve. The most frequent accompanying cardiac disorders are coronary sclerosis and coronary and hypertensive cardiac disease. Cardiac disease as a complication accounts for approximately 81 per cent of the total mortality. However, even though the chances of recovery are slim the surgeon must remember that his estimate of risk is subject to error and that every patient should be given the opportunity to avoid the status of a "cardiac cripple." An analysis of the causes of death reveals that the primary cause was bronchopneumonia. This proves the value of establishing precautionary measures in the entire period of treatment to avoid respiratory infections. Attention should also be focused on atrophy of the liver. The relation of hepatic failure to surgical risk in cases of hyperthyroidism has not received sufficient consideration. Because of the high risk entailed, every possible precaution must be exercised and technical errors avoided in these cases. The choice of the anesthetic agent to be used is a prime consideration. Local infiltration supplemented by inhalation of nitrous oxide and oxygen has proved effective. Prolonged anesthesia by inhalation is avoided and the susceptibility to pulmonary complications is reduced. The average duration of inhalation anesthesia will be from eight to ten minutes. Local anesthesia, unsupplemented, is indicated for patients with obstructive dyspnea. The indications for lobectomy are limited. Patients in an extremely toxic condition with limited reserve and patients with congestive heart failure may have to be subjected to lobectomy to minimize the hazard. Such patients need special preoperative and postoperative preparation. Such care is most effectively achieved by the internist and the surgeon as a team. The risk of operation for such individuals is great but when the great number of excellent results are reviewed it seems justified.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Ophthalmology, London

24:373-420 (Aug.) 1940

- Convergence Deficiency. Ida Mann.—p. 373.
 *Specific Inflammation of Cornea in Chickenpox. A. Loewenstein.—p. 391.
 Multiple Ruptures of Choroid with Retention of Good Vision. H. Neame.—p. 399.
 Exfoliation of Lens Capsule with Pathologic Report: Case. A. Garrow and I. C. Michaelson.—p. 400.
 Some Cases of Traumatic Myopia. O. G. Morgan.—p. 403.

Corneal Inflammation in Chickenpox.—Loewenstein reports two cases of iris disorder following chickenpox which is parallel to that seen in smallpox, in herpes iridis (herpes zoster), in inoculated herpes iridis in rabbits and in vaccinia. Depigmented spots of the iris remained after the exanthem healed. This, the author says, completes his earlier observation of vitiligo iridis following chickenpox. He believes that the now recognized forms of vitiligo iridis in smallpox, chickenpox, herpes iridis (zoster), inoculation iritis in rabbits (herpes febrilis) and scarlet fever present a unity from which a biologic relationship between their germs can be deduced. The corneal infection does not correspond with any known change of the cornea. It cannot be confused with anything else. The involvement of the deeper layers of the corneal parenchyma in the first weeks of the infection and their rising to the surface later on is striking. The concomitant iritis is a slight one. The slit lamp depicts only the tiny exudate on the lens capsule. No opacities in the fluid of the anterior chamber are detected and no new formation of vessels in the cornea. Photophobia is absent even toward the end of the inflammation when the surface layers (epithelium) are more involved. The author thinks that this observation is the long sought "missing link." On biologic grounds, being aware of the appearance of a vitiligo iridis in chickenpox, one expected to find the process causing the acute disease—a process which had previously escaped observation. As the assumed virus of chickenpox is related to the virus of herpes, it was to be expected that the clinical picture of chickenpox keratitis would be very similar to that of a deep herpes. This assumption proved to be true. He wonders how the disturbance escaped recognition with chickenpox being so widespread. He does not believe that the corneal involvement in chickenpox is a rare one, but since the majority of chickenpox cases heal without medical assistance and parents know that even the eye complications are not dangerous, ophthalmologists do not attend the patients and therefore the condition has apparently been missed.

British Journal of Radiology, London

13:257-292 (Aug.) 1940

- Localization and Extraction of Radiopaque Objects by Means of "Light Compasses." C. Chaussé.—p. 257.
 Effect of X-Rays on Tumor Growth When Tumor Itself Is Not Irradiated. S. Russ and G. M. Scott.—p. 267.
 Two Unusual Gastrointestinal Cases. I. B. Barclay.—p. 273.
 Effect of X-Rays on Cells Cultivated in Vitro. I. Lasnitzki.—p. 279.
 Optimal Densities of Radiographs. G. E. Bell and E. E. Smith.—p. 285.
 Gallbladder Visualized by Gas. P. Kerley.—p. 289.
 Venous Thrombosis Following Injection of Uroselectan B. F. H. Kemp.—p. 291.

British Medical Journal, London

2:143-178 (Aug. 3) 1940

- Vitamin C Requirements of Native Mine Laborers: Experimental Study. F. W. Fox, L. F. Dangerfield, S. F. Gottlieb and E. Jokl.—p. 143.
 Surgical Treatment of Air Raid Casualties: Review of Twelve Cases. A. R. Hodgson and G. K. McKee.—p. 147.
 Fractures of Shaft of Tibia: Method of Reduction. I. S. Smillie.—p. 150.
 Fulminating Sonne Dysentery: Report of Two Cases. R. T. Cooke.—p. 151.
 Compound Hypertonic Salt in Treatment of Septic Wounds. C. J. Cellan-Jones.—p. 152.
 Malignant Stomal Ulcer: Case. S. A. Yaffe.—p. 153.

2:179-212 (Aug. 10) 1940

- *Pulmonary Embolism and Infarction. B. Parsons-Smith.—p. 179.
 Muscular Rheumatism: Local Injection Treatment as Means of Rapid Restoration of Function. M. Button.—p. 183.
 Chronic Blepharitis in Children: Its Treatment with Aniline Dye Compound. A. T. Elder.—p. 185.
 Chronic Acetanilid Poisoning. T. N. Morgan and A. G. Anderson.—p. 187.
 Tender Teeth: Their Surgical Importance. H. T. Roper-Hall and A. P. Bertwistle.—p. 188.

Pulmonary Embolism and Infarction.—According to Parsons-Smith, pulmonary embolism is a disability chiefly affecting people at or past middle life. A variety of factors are concerned in the formation of the thrombus from which the embolus originates. They include local trauma, the presence of organisms and several morbid developments such as slowing of the blood stream, chemical and physical changes in the blood and injury of the vascular epithelium. The primary thrombosis occurs often in the external iliac, the femoral or the saphenous veins; but other vessels—the inferior vena cava and the pulmonary and internal iliac veins—may be responsible, as also may the heart itself in the advanced stages of myocardial failure. The clinical picture of embolic obstruction of the main pulmonary artery or its major branches is moderately distinctive. Some of these cases are immediately fatal; in others characteristic signs and symptoms are observed for varying periods before death, the patient being suddenly seized with breathlessness, faintness and feelings of severe substernal oppression which tend to persist in spite of treatment. Physical examination discloses the shock syndrome. Characteristic signs include pallor, sweating, lividity and dilated pupils; the pulse is rapid and soft and the blood pressure considerably lowered; the respiratory rate is accelerated and its excursion usually diminished; collapse, often ushered in by uncontrollable vomiting, deepens, and unconsciousness generally preludes death. It may prove difficult to differentiate pulmonary embolism from coronary thrombosis, because during the early stages the two are singularly alike. The clinical phenomena common to both are pain in the chest, tachycardia, rapid respiration, pallor, cyanosis and a soft and frequently imperceptible pulse, a falling blood pressure, shock with syncope tendencies, sweating, vomiting and cardiographic signs typical of myocardial ischemia. The past history of the patient and the circumstances leading up to the onset of the illness will often furnish details helpful in the differential diagnosis. Previous heart disease, an exhausting period of decompensation and the clinical phenomena suggestive of long-standing hypertension or a history of effort angina favor the development of coronary thrombosis. On the other hand, pulmonary embolism might be suspected if the acute seizure is a sequel to an operation or accident. Moreover, the pain of pulmonary embolism is usually referred to the side of the chest rather than to the substernal region. Other features peculiar to pulmonary embolism include extreme cyanosis and breathlessness associated with shallow respiration, the discomfort in the side being intensified by any attempt to increase the depth of the breathing. Apart from cases of massive embolization in which pulmonary edema occurs rather than hemorrhagic consolidation, the incidence of true infarction with moderate-sized emboli is relatively small. Chronic cardiac disease, postoperative invalidism and septic wounds seem to favor the formation of pulmonary infarcts, the responsible factor being passive hyperemia in the lungs. A slightly raised temperature and a relatively rapid pulse may be the only indications that a focus of phlebitis and venous thrombosis which may be responsible in due course for embolization in the pulmonary circuit and, later, for a hemorrhagic infarct, is in process of formation. As early indications of the latter, the temperature and the pulse rate rise abruptly, the respiration quickens, and the symptoms of shock and mental anxiety are intensified. Pain, exaggerated by deep breathing, is another early symptom. The physical signs of pulmonary infarction are rarely distinctive. A friction rub may be audible; there may be a circumscribed area of dullness with rales and altered breath sounds and diminished expansion on the side of the lesion. X-ray examination is often a valuable aid in the diagnosis. The clinical picture of pulmonary embolism and infarction should be supplemented by electrocardiographic investigation.

Lancet, London**2:155-184 (Aug. 10) 1940**

- *Capillary Fragility: Critical Analysis. G. H. Bell, S. Lazarus and H. N. Munro.—p. 155.
*Excretion of Pregnanediol in Toxemia of Pregnancy. C. L. Cope.—p. 158.
Reduction of Fractures of Forearm, Wrist and Metacarpals. T. M. J. d'Offay.—p. 159.
Mortality from Lobar Pneumonia in London. W. J. Martin.—p. 161.
Method of Arresting Clot in Transfusion with Stored Blood. A. M. Giles.—p. 162.
Lordosis and Muscular Dystrophy. G. E. Donovan.—p. 162.
Culture of Yellow Fever Virus in Vitro. G. M. Findlay and F. O. MacCallum.—p. 163.

Capillary Fragility.—Bell and his colleagues sought to determine the variations in the capillary fragility by Göthlin's test among 346 healthy British students, to define the range of normality and to determine the effect of ingested vitamin C on those students considered to have an increased capillary fragility. The number of small cutaneous hemorrhages occurring under standard conditions was taken as an index of the capillary fragility or resistance. Variations in the illumination altered the mean number of petechiae detected. A 300 watt lamp at a distance of 2 feet proved to be a good illuminating standard. Among 89.3 per cent of the students, less than eight petechiae were found. Under the conditions of the test eight or more petechiae may be regarded as unusual; this agrees with the opinion reached by Göthlin. The ingestion of vitamin C by the thirty-five students who had a petechial count of eight or more reduced the petechial count to less than eight in two weeks. The ingestion of vitamin C had no effect on petechial counts of less than eight. The antecubital fossa was found to be as suitable as the forearm for the test. There were five healthy persons among the 346 whose increased capillary fragility was not influenced by the administration of vitamin C or of vitamin P. This, the authors believe, is the only reported group of healthy people with an increased capillary fragility resistant to treatment with vitamin C in whom the effect of vitamin P has been studied. Apart from abnormal influences—for example fever and the administration of heavy metals—two factors influence capillary fragility in health: menstruation and ascorbic acid. Other factors may be involved, as in the few students whose high petechial counts were unaffected by the administration of vitamin C or any other factor so far known. The authors found that even when the conditions were carefully standardized it still remained difficult to assess the capillary fragility of the subject. Variation in the values found on the right and left arms of a single individual were frequent. Therefore they suggest that the average of the petechial count on the two arms of an individual appears to give a more accurate indication of the true capillary fragility. Göthlin now makes all determinations on both arms and proceeds from the mean figure of the two determinations.

Excretion of Pregnanediol in Toxemia of Pregnancy.—Cope states that observations on ten pregnant women suffering from toxemia uncomplicated by nephritis have not confirmed the claim that the amount of the sterol complex pregnanediol glucuronide excretion, which is abundant in the urine in normal pregnancy, is greatly reduced in late toxemia of pregnancy. Pregnanediol was, however, absent in the last week of pregnancy from the urine of a pregnant woman with chronic nephritis. This suggests to the author that renal damage may be a more likely cause of interference with the excretion of pregnanediol. He considers it unwise to conclude that any difference which may be found between the rates of excretion of pregnanediol in normal pregnancies and in pregnancy toxemia is necessarily due to the toxemia, for the excretion of pregnanediol might be interfered with by many conditions of ill health other than toxemia. He has compared the daily excretion of pregnanediol glucuronide in late pregnancy toxemia with that of women having other general diseases late in pregnancy. The patients with pregnancy toxemia not only had a persistent albuminuria but also a raised blood pressure with or without edema, and one woman had severe eclamptic fits. The study shows that in none of these cases was the daily excretion low (from 28.5 to 55.8 mg.); the mean daily excretion was 39.4 mg. The excretion among the ten pregnant women with other diseases

(hypochromic anemia, cardiac failure, diabetes mellitus, pyelitis and others) were much more variable; the mean value, 49.5 mg. a day, was essentially the same as in normal pregnancies. It was rather higher than the mean of the toxemic group, but the difference does not seem large enough to be of significance.

South African Medical Journal, Cape Town**14:251-270 (July 13) 1940**

- Doctors' Hobbies: Music and the Gramophone. N. V. Storr.—p. 253.
"Robert Knox and His South African Research." P. R. Kirby.—p. 254.
Diet and Osteodystrophic Diseases in Domestic Animals. A. I. Malan.—p. 261.

Bull. of Health Org., League of Nations, Geneva**8:551-796 (Nos. 4-5) 1939**

- Tuberculosis in Rural Areas. G. Ichok.—p. 551.
Organization of Public Health in Rural Areas of Belgium. R. Sand.—p. 617.
Public Health Organization of Province of Luxemburg. M. Graffar.—p. 640.
Application of Health Indexes Selected for Rural Districts to Providence of Luxemburg (Belgium). M. W. Selleslags.—p. 649.
Recent Trend of Medicosocial Policy in Europe. R. H. Hazemann.—p. 662.
Report of the Housing Commission.—p. 732.

Schweizerische medizinische Wochenschrift, Basel**70:661-684 (July 13) 1940**

- Hydrochloric Acid Collargol Reaction. W. Nagel.—p. 661.
Chemotherapy with Sulfamethylthiazole. A. Fischer.—p. 666.
Cranial Traumatism and Craniocerebral Wounds Caused by Projectiles. A. Jentzer.—p. 667.
*War Injuries of the Thorax. T. Naegeli.—p. 674.
*Diseases of Coronary Vessels and Military Service. M. Holzmänn.—p. 676.

War Injuries of the Thorax.—Naegeli points out that the prognosis in cases of bilateral pneumothorax is grave. In unilateral open thoracic wounds a displacement of the mediastinum toward the uninjured side occurs with decreased ventilation of the uninjured lung and unsatisfactory blood arterialization as a consequence. In gaping intercostal soft part wounds the collapsed lung may eventually be pressed out of the thoracic wound by means of compressed breathing enabling thus the wound to close, or else the retracted lung may be fixed by lying on the wounded side or by percutaneous suture. Even closing of the thoracic wound with airtight dressing or suturing soft parts improves the patient's condition, as the injurious variations in pressure during breathing become thereby eliminated. The consequences of valvular and tension pneumothorax are tympanites over the lungs, widening of the intercostal spaces, cyanosis and dyspnea. It is treated by puncture, preferably with a cannula provided with a valve toward the outside. Severe phenomena of displacement due to hemorrhage following injury of a lung vessel also require puncture. A small blood transfusion favors arrest of the hemorrhage. The mediastinal emphysema requires an incision into the suprasternal fossa. In pleural empyemas, puncturing and suction should be used. Change of dressing should possibly be done without getting air into it. In view of possible infection, large and particularly torn soft wounds of the thoracic wall should be excised and eventually sutured. Morphine should be amply administered during the first days. The patients may be best transported in a sitting position leaning on the injured side. Severely wounded patients or patients who have been operated on should not be transported for twenty days at least.

Coronary Vessel Disease and Military Service.—Holzmänn states that in diseases of the coronary vessels the main clinical symptom is angina pectoris. Three types may be distinguished: 1. The effort-angina of fifteen minutes duration at the most, caused by a transient and reversible coronary insufficiency. 2. Increased attacks of angina that may occur at rest and may last longer than fifteen minutes, caused by increased and protracted coronary insufficiency. They are reversible, although they leave behind a lasting ischemic injury to the myocardium. 3. The status anginosus of greatest intensity, caused by an acute irreversible coronary occlusion with a massive infarction of the heart as a consequence. It often occurs without provocation and lasts from hours to days. Gradually

and imperceptibly developing coronary stenosis is at the bottom of the first two forms. Thrombotic occlusion of the small coronary arterial branches may occur in the second form. An acute thrombosis of an important coronary arterial branch occurs in the third form. Besides the degree of impassibility of the diseased vessels, the ability of accommodation of the collateral circulation is significant. Anginal pains are not necessarily caused by disease of the coronary vessels. They may also be produced by a transient functional disturbance, as in case of angina pectoris vasomotoria or in the initial stages of tobacco angina. They may be the consequence of a relative coronary insufficiency, as in case of hypertrophic hearts. The angina pectoris ambulatoria is typically localized, radiating into the left shoulder, left arm or both arms. It lasts a few minutes and is influenced by physical effort, whence the diagnostic value of carefully dosed physical labor. A glyceryl trinitrate tablet dissolved in the mouth may also demonstrate the ischemic nature of the ailment by its quick sedative effect. In status anginosus of greatest intensity the pain can be allayed only with morphine or its substitutes. In the presence of a coronary circulatory disturbance the army physician should hospitalize the patient for further examination. This consists in taking electrocardiograms at rest and in case of negative observations after physical labor. Fluoroscopy of the thorax, blood pressure, sedimentation and Wassermann reactions complete the examination. Should this disclose a lesion of the myocardium or a coronary insufficiency, the patient should be kept under observation and treatment until the symptoms have disappeared or a stationary condition has been obtained. The following situations may arise before the military examining commission: 1. No more anginous symptoms, heart physically normal, electrocardiogram normal, no heart insufficiency: dispensation from service for three months. In case the physical condition remained satisfactory after a trial period in service following the dispensation period: fit for auxiliary service, armed eventually. 2. Anginous symptoms still present or electrocardiogram shows pathologic condition, eventually both, physically unnoticeable or slightly abnormal heart condition, no heart insufficiency: administrative auxiliary service at most. 3. Presence of heart insufficiency, electrocardiogram reveals pathologic condition, whether angina pectoris is present or not and whether physical heart condition is abnormal or not: unfit for service. Estimation of military insurance liability remains subjective. Refusal of claim is justified only when symptoms occurred without strenuous physical labor and infectious or toxic influences in service, provided prompt medical measures were taken. The safest estimate can be made in case of death and necropsy.

Archivos Argentinos de Pediatría, Buenos Aires

13:557-665 (June) 1940. Partial Index

Lymphosarcoma of Mediastinum. A. Casaubon, J. L. Monserrat and A. Letamendi.—p. 557.

*Sulfanilamide in Treatment of Erysipelas in Children. F. Bazán and R. Maggi.—p. 593.

Sulfanilamide in Erysipelas in Children.—Bazán and Maggi used sulfanilamide in the treatment of acute erysipelas of the head and face or the limbs of thirty children ranging in age from 2 to 10 years. The disease developed in the majority of cases in the course of convalescence from scarlet fever, diphtheria or chickenpox. The drug was given by mouth in daily doses which varied between 0.1 and 0.15 Gm. for each kilogram of body weight, in three or four fractional doses, up to forty-eight hours after the return of the temperature to normal, after which half the dose was given for two or three more days. The treatment as a rule lasted from five to eight days. All the patients recovered. Improvement was noted on the first day of treatment by the arrest of the spread of the lesion and a diminution of inflammation, redness and local tension. The authors found that the height of fever and the course of the disease were favorably influenced by sulfanilamide and that the duration of both diminished when compared with the effects of previous therapeutic methods. They conclude that sulfanilamide is the treatment of choice in erysipelas of children, since the treatment is well tolerated and yields a recovery in 100 per cent of the cases. The drug appears to have a specific effect on the streptococcus and on the disease itself.

Vrachebnoe Delo, Kharkov

22:161-240 (No. 3) 1940. Partial Index

- Sanitation and Medical Service in Western Ukraine and in White Russia in the Past and Today. D. V. Gorfin.—p. 165.
Hepatopancreatorenal Syndromes. A. I. Frankfurt.—p. 173.
Catarrhal Jaundice and Serous Inflammation of Liver. A. S. Berlyand and P. I. Lirtsman.—p. 177.
*Treatment of Parenchymatous Jaundice. A. Firdman.—p. 179.
Jaundice on the Basis of Gastrogenous Hepatitis. M. M. Pismarev and M. S. Kiveliovich.—p. 183.
Alimentary Chloridemia in Diseases of the Liver. L. S. Litshits and E. V. Kosevich.—p. 185.

Treatment of Parenchymatous Jaundice.—In his clinical observations on thirty-six cases of jaundice, Firdman noted a positive urobilin reaction in the course of the disease indicating the presence of a hepatitis. Fractions of bile from the duodenal contents revealed cloudiness in fractions A and C, leukocytes, cylindric epithelium and mucus on microscopic examination. Toward the termination of the disease the duodenal bile became clear and transparent. The patients were treated by intravenous injection of from 3 to 4 cc. of a 40 per cent solution of methenamine and from 16 to 17 cc. of a 40 per cent solution of dextrose. The injections were given daily or every other day. Patients received a milk diet, an occasional mild laxative and a warm bath every other day. Gastric intubation was practiced several times in the course of the disease. The average hospital stay amounted to 20.3 days. There were no instances of transition to acute yellow atrophy, despite the fact that some of the cases were severe and exhibited in the beginning symptoms suggestive of impending acute yellow atrophy. The author concludes that the combined methenamine and dextrose treatment is capable of shortening the course of parenchymatous jaundice and of preventing its passage into acute yellow atrophy.

Geneeskundig Tijdschr. v. Nederl.-Indië, Batavia

80:1727-1772 (July 16) 1940

- *Clinical Investigations in Connection with Beriberi: So-Called Subclinical Vitamin B₁ Deficiency. F. M. Meyers.—p. 1727.
Determination of Protein Content of Blood of Patients with Nutritional Edema. A. G. van Veen.—p. 1747.
Some Diseases of Bones of Foot. S. A. Tahar.—p. 1761.
Leproid Skin Eruptions in Frambesia. M. Soetopo.—p. 1765.

Subclinical Vitamin B₁ Deficiency.—Meyers points out that in the temperate zones the subclinical deficiencies of vitamin B₁ show a much wider range of symptoms than do those of the tropics. He thinks that this is due to the fact that, in the Netherlands East Indies at least, B₁ deficiencies are relatively uncomplicated and chiefly of exogenous origin, whereas in European countries and in the United States these subclinical deficiencies are often caused by alcoholism and chronic diseases of the intestinal tract and are complicated by an atypical form of pellagra. The author investigated the vitamin B₁ excretion in the urine of fourteen healthy Javanese laborers before and after the subcutaneous administration of vitamin B₁. Attention was paid also to the diuretic effect of vitamin B₁ and to its influence on the increase in blood pressure after epinephrine. The results of these investigations could be compared with observations on three healthy "prepared" persons who had received a diet with a high vitamin B₁ content and on three patients with beriberi. The daily excretion of vitamin B₁ in the healthy laborers varied between 0 and 63 micrograms. After the injection the excretion varied between 2 and 50 per cent (in most cases between 10 and 30 per cent). One of the three healthy "prepared" persons showed excretion values of the same order as did the patients with beriberi. In nine of the fourteen laborers the administration of vitamin B₁ had a diuretic effect. However, there was no clear correlation with the vitamin B₁ excretion values. This vitamin has the properties of a true diuretic. In three of eight healthy persons the increase in systolic blood pressure after epinephrine became much stronger after vitamin B₁ had been administered. The same was observed in the patients with beriberi but in none of the three "prepared" persons. Thus this vascular reaction proved to be helpful in determining deficiency of vitamin B₁ where other means had failed; but no correlation could be detected with the excretion of vitamin B₁ in the urine. The excretion of vitamin B₁ in the urine by itself often does not produce figures sufficiently unequivocal to judge whether deficiency exists or not.

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INDUSTRIAL HEALTH AND NATIONAL DEFENSE

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NEW YORK

An adequate national defense requires a vigorous health offensive! Stimulated by the launching of the nation's defense program, the organized medical and public health professions have been quick to realize the importance of the contributions which they can make to health preparedness. The mobilization of the medical profession for any emergency that may arise has been successfully inaugurated with the appointment of a National Committee on Medical Preparedness by the American Medical Association.

Man power is now the greatest need both of industrial production and of military defense. Adequate man power is dependent on the highest type of mental and physical fitness; nor should the health of women workers be forgotten in these times, in view of their important contributions to industrial production and operation and their possible substitution for men in times of serious national emergency. The speed-up of production and manufacture, the development of new material and methods, the increased employment of new workers unused to the hazards of industry will require new industrial health routines and regulations, more intensive study and research in the field of occupational diseases and industrial poisons and the extension and improvement of all health and safety education. To speed the work but to spare the worker should be our aim!

GENERAL HEALTH PREPAREDNESS

Industrial health preparedness in the United States is only one phase of a general health preparedness program, although from the standpoint of national defense industrial health undoubtedly should command first attention, since it involves our adult civilian population of productive workers and the enlisted land, sea and air forces of the country, on all of which successful national defense in times of emergency must depend. The first essential in our countrywide public health program during these times of preparation for adequate national defense is a thorough scanning of our organized medical and health machinery to be sure that important matters of coordination and administration are provided and that there are no gaps or weaknesses in federal, state, county or city health administration or in public and private medical facilities. Moreover, during times of temporary national emergency, centralization of medical and public health authority is required.

Read before the International Society of Medical Health Officers,
Detroit, Oct. 7, 1940.

INDUSTRIAL HEALTH

During the World War of twenty-five years ago I had the privilege of serving as commissioner of health of one of the New England states. Our work was closely integrated with that of the federal Public Health Service during the war period. In fact, the Surgeon General of the Public Health Service suggested that all state health officers remain at their posts in order to cooperate in the federal wartime health program. The one thing I do not remember as an important part of our federal-state program at that time was industrial health or industrial medicine. The fact is that private industrial medicine in this country was then only in "swaddling clothes" and one or two industrial hygiene units in state governments had only just been born. The Division of Industrial Hygiene of the United States Public Health Service and the Section on Industrial Hygiene of the American Public Health Association are only a little over 25 years old, having been created in 1914. The American Association of Industrial Physicians and Surgeons also is but 25 years old, while the American Industrial Hygiene Association held its first annual meeting this past June. It has been only during the past three or four years that bureaus of industrial hygiene have been rapidly extended in health departments of various states and cities, under the excellent leadership of the United States Public Health Service. Only since 1937 has the Council on Industrial Health of the American Medical Association been operative in cooperation with committees or activities on industrial health in thirty-four state medical societies, most of which have been organized during the past three years. In other words, the whole specialty of industrial health as we know it in this country is at the present time only a little over 25 years old and has developed almost entirely since the World War.

As a part of a national defense program, it becomes evident from the foregoing facts that industrial physicians and industrial hygienists of this country have little in the way of precedent or wartime experience on which to base their efforts, unless it be, to some extent, the recruiting experience and a few engineering experiences during the World War. As a matter of record, it may safely be predicted that the present national preparedness program will be to industrial medicine and industrial hygiene in the United States what the World War was to the greater stimulation of interest and plans in the field of social hygiene. It is particularly to be hoped that the present plans for national defense will result in more active cooperation between industrial medical departments and local and state health departments and medical societies. One concrete achievement of such coordinated efforts might be a much needed national plan for standardized recording and reporting of industrial morbidity and mortality, particularly of occupational diseases.

PRIVATE INDUSTRIAL MEDICINE

One of the most important problems common to industrial medicine and military medicine is that of traumatic surgery. Industrial medicine's so-called parents might be said to have been (1) traumatic injuries of workers and (2) workmen's compensation laws. In any national preparedness program much should be done to increase the facilities for teaching traumatic surgery in our medical schools and in developing postgraduate instruction for practicing physicians through county and state medical societies and military organizations. In this connection, much of the leadership in promoting and teaching traumatic surgery might be available from those industrial surgeons who even during peace time have become experts in the fields of traumatic surgery and first aid treatment of accidents and infections.

Industrial medicine, even in a national defense program, must be preventive and educational as well as reparative, reconstructive and curative. It must concern itself with nonoccupational as well as occupational diseases. Industrial physicians will have important parts to play in the national defense program from the standpoints both of (a) the physical and mental fitness of civilian workers and enlisted forces and of (b) the safety and healthfulness of working and training environments.

During the present national emergency, professional facilities must be made available not only for a successful medicomilitary program but also for the continuity of adequate medical care for the civilian working population. In the latter connection it should be stressed that much of the load of responsibility will continue to be carried by individual practicing physicians. The great bulk of industrial medical work is now being carried on by private physicians on a part time basis. One of the first essentials, therefore, in an industrial health preparedness program is to determine all physicians in the United States who are qualified for industrial medical service, with some indication of their experience and special fields, such as administration, physical examinations, first aid, industrial surgery, industrial toxicology and industrial health education.

The possible availability of properly qualified full time industrial physicians and surgeons for special assignments in the federal service should be given careful attention while at the same time acknowledging the fact that as a group the greatest usefulness of trained industrial physicians in a national emergency may be in their remaining at their posts in private industrial organizations. The inauguration of a plan for state and regional consultants on industrial health would be desirable in the interest of better organization and coordination. Such consultants, during the preparedness emergency, might be attached to the United States Public Health Service. Their chief function would be as consultants and coordinators working in cooperation with (a) state and local health officers, (b) state and county medical society committees on industrial health, and (c) industrial medical departments.

The Council on Industrial Health of the American Medical Association at its last meeting expressed its willingness to assist in the development of intensive training on industrial health methods for full time and part time industrial physicians, through its organization of committees in state medical societies. The Council already has acquired information on all major medical agencies interested in employee health and on the avail-

able facilities for undergraduate and postgraduate industrial medical training in the educational institutions of the United States, as well as other data of potential value in an industrial health preparedness program as a part of national defense. A general statement of medical relationships in industry and of industrial medical education appeared in a special industrial health issue of *THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION* last February.¹ Speaking as a member of the Council, which is a standing committee of the Board of Trustees of the American Medical Association, we would welcome the cooperation of the International Society of Medical Health Officers in all matters pertaining to the advance of industrial health in the United States.

OBJECTIVES OF INDUSTRIAL AND MILITARY MEDICINE

The basic objectives of both industrial medicine and military medicine are much the same, namely:

1. To ascertain, by examination, the fitness of individuals for civilian work or military service, and to place individuals in activities consonant with their physical and mental assets and liabilities.
2. To maintain and improve the health and efficiency of those already employed or in government service.
3. To educate the worker or the enlisted man on matters pertaining to personal hygiene.
4. To reduce lost time and absenteeism from industrial occupation or military duty because of illness or injury.

To reach these objectives of either industrial or military medicine a definite plan or program must be formulated under suitable medical direction, with the employment of qualified physicians, surgeons, nurses and other specialists and technicians as may be needed. Medical offices and adequate emergency, dispensary and hospital facilities are essential. Suitable physical examination and medical records are necessary. Medical supervision also should include all matters of general sanitation and environmental hygiene, with the assistance of specialists, such as engineers and chemists, as may be required.

PHYSICAL EXAMINATIONS

Of primary importance among the objectives common to industrial and military medicine are physical examinations. The scope or extent of preplacement examinations must be based largely on the character and general conditions and needs of the industry or the military assignment. Such examinations may vary all the way from a very brief, superficial physical inspection to a detailed medical examination of an hour or more. We shall have to strike some midground as far as the average examination is concerned. We certainly want to make examinations that are worth something; on the other hand, there is a limit that may be reached as to their practicability from the standpoints of time and expense. Physical tests of employees during the national defense emergency might possibly be based on requirements and record forms previously agreed on jointly by military and industrial authorities. This would be the means of saving time and in the interest of standardized procedures and records in the proper placement of workers in civilian or military positions.

The purpose of medical examinations should not be to keep people out of work or out of military service but rather to know what the actual conditions are and to make certain that the individual does not take up a job for which he is not fitted. Time will not permit of a detailed account of the various types of physical

1. *Industrial Health*, J. A. M. A. 114: 573 (Feb. 17) 1940.

examination procedures and forms of examination classifications or of acceptance and placement standards and causes for rejection. These subjects have been extensively covered from time to time in pamphlets and bulletins of various voluntary and government organizations and are available to those interested in the subject of physical examinations.

As interest grows in the subject of mental hygiene, which underlies the whole realm of physical health and safety, more and more attention must be given to mental and nervous system examinations in connection with routine physical appraisals of civil and military groups. Bad mental hygiene of individuals and masses to a large degree is responsible for much industrial unrest and even for lowered morale in armed forces. To obviate this the promotion of a sound program of mental health in industry and among enlisted forces is the only alternative; this, in turn, can be built only on knowledge obtained through satisfactory mental inventories of employee or recruit groups.

Of all measures of industrial health preparedness from the standpoint of national defense there is none more important than the periodic health examination of individuals in working groups. Such examinations should serve not only (a) to guard the health of civilian employees in industry, particularly those in the so-called war industries, from excessive fatigue and the possible ill results of speed, pressure and special hazards associated with national preparedness but also (b) to maintain a high level of physical and mental fitness in those private industrial "reservoirs" which at any time might have to be drawn on for government service. Business organizations may thus contribute to national defense by encouraging such health examinations among their employees. Physical examinations, both initial and periodic, fall short of their full value unless followed up with programs for the control and correction of incipient diseases and impairments which are found. Moreover, these examinations, above all, should be considered as important educative experiences.

PUBLIC INDUSTRIAL HYGIENE

Prior to 1936 there were in the United States only five state departments of health and two or three state departments of labor conducting industrial hygiene activities, and even these activities were of limited nature. As of 1940, a total of thirty-nine state and local industrial hygiene units have been established in twenty-nine states and two territories, mostly in departments of health. Some of these are of very recent creation and have only skeleton organizations. There is great need that these be strengthened as rapidly as possible as a part of the national industrial health preparedness program. Moreover, additional industrial hygiene units should be organized without delay in the remaining states and territories and additional local governments, particularly of the larger cities. Steps should be taken to make possible the financing of these industrial hygiene units by state and local appropriations. At present nearly 80 per cent of funds budgeted for public industrial hygiene is contributed by the federal government. During the present emergency, additional funds should be provided to the Public Health Service to train additional industrial hygiene personnel. Care should be taken to emphasize that such industrial hygiene activities are properly the function of health departments and to discourage steps taken in a few localities to develop such essential health services in agencies other than health departments.

CONCLUSION

It may be stated that industrial physicians and industrial hygienists, like medical public health officers, are ready and willing to serve their country in this preparedness emergency. Industrial health work should be a strong arm in national defense, particularly in the preservation of expert workers and assisting in the development of additional skilled workers. Reducing lost time due to occupational and nonoccupational illness and accidents and cutting down excessive exposure to injurious materials are part of the industrial health program which will be conducive to maximum national effectiveness and production. It is particularly necessary that studies be made to determine unfavorable environmental factors in the production of war equipment and munitions. The business employer or the governmental unit that considers reducing its industrial health program at this time, because of what at the moment may seem to be more important activities, is most unwise. As a matter of fact, the needs of national defense require a strengthening and broadening of the entire industrial health program all along the line from private industry to local, state and federal jurisdictions. In this significant period of rearmament, during which our chief defense will be our industrial skill, let us be sure that we place first on our list the health and safety conservation of our industrial workers.

195 Broadway.

OPPORTUNITIES FOR PHYSICIANS IN INDUSTRY

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From the beginning let it be remembered that this paper is not concerned primarily with "opportunities for industrial physicians." I shall principally consider the opportunities which await the rank and file physician, the general practitioner, in his contact with industry. Let it also be remembered that no facts or percentages which have been gathered in the many studies in this field can be regarded as strictly accurate; no specific figures exist, and it is possible to regard percentages given as indicating only general trends. What is this "industry" that is discussed so casually? Industry is composed of approximately 18 or 20 million human beings who are scattered in groups of various sizes throughout the length and breadth of the country. These individuals are engaged in every conceivable type of occupation and they are working in every conceivable environment. The Council on Industrial Health has listed 241 establishments which employ more than 2,500 men and women, and these larger establishments employ only 10 or 11 per cent of our total 18 or 20 million workers. Sixty-two per cent of this enormous number of individuals are working together in little groups of 500 or less. What sort of medical care are these people getting at the present time? According to the American Medical Directory there are approximately 1,400 or 1,500 physicians who either limit their work to the industrial field or who otherwise regard it as their special interest. The fact becomes at once apparent that the majority of American industrial workers receive medical care from physicians whose interest in this industrial work is, to say the least, secondary.

Read before the Section on Preventive and Industrial Medicine and Public Health at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.

The physicians serving industry may be divided into three broad classifications. In the first group are full-time industrial physicians, some of them actively engaged as plant physicians, some working with insurance companies, others who regard themselves as consultants, but all of them choosing to consider industrial medicine or surgery, or both, as their particular specialty. The second group includes doctors who serve industry on a part-time basis. Ordinarily these are doctors with private practices of their own in the field of general medicine or surgery. They have, however, definite understanding and interest in the medical problems in industry, and they ordinarily have some sort of a working agreement with one or more particular industrial groups. I know of one man who could be regarded as a good example of this type: he is the works physician for a fairly large industrial plant during the morning but in the afternoon, unlike the leopard, he does change his spots and emerges as a pediatrician. So far he has refused to confess to me which he regards as his vocation and which his avocation.

In the third category must be included almost all the remaining doctors in the country. Today there are but few doctors who do not occasionally encounter problems which in one way or another should be classified as industrial. Unfortunately the industrial connection in these problems frequently goes unrecognized; but it is possible that one patient's continued headaches result not from chronic sinus trouble or eyestrain but from a mild and repeated exposure to carbon tetrachloride. How about the overworked executive in an industrial concern? If the family physician who is advising this man to take things easy would cooperate with the plant physician he would have the satisfaction of knowing that his suggestions would be carried out. How about that obscure case of eczema which seems to be defying both diagnosis and treatment? The consideration of the substances with which the man works is most certainly of prime importance, of just as great importance as arranging for changes in the type of work which a girl does in the early months of her pregnancy. So many of the general practitioners throughout the country blindly close their eyes to the possibilities of cooperating with industry that they really represent a greater problem than the unhappy few who admittedly are ready to put the blame for every disorder on the patient's work.

That this state of affairs should exist is hardly to be wondered at if one thinks for a moment of the training which the average physician receives in matters pertaining to industrial medicine. In the academic year just closed fifty-two medical schools were listed as providing required instruction in industrial hygiene. On the average, from four to five hours of lectures is devoted to this work and less than half of these schools provide any field trips, although many of them do require that the students should prepare some sort of a sanitary survey. Twelve schools were listed as providing elective or postgraduate courses in industrial hygiene and nine other universities are equipped to provide advanced instruction in this field. Fortunately, this list is growing each year; ten and fifteen years ago, however, the list was painfully brief. This means of course that, except for recent graduates of these fifty-two medical schools, an enormous number of doctors have never received any form of instruction whatever relating to industrial matters. As I look back on my own exposure to industrial hygiene in medical school I realize how completely it failed to place the

specialty of industrial medicine before the students as an attractive possibility for a future career. It was much like being served a plate of cold unseasoned spinach in a restaurant famous for the elegance of its cuisine. Industry and the medical schools must get together if the students are to see the field of industrial medicine in its proper perspective. One can even visualize the time when some forward looking hospital will make arrangements with an industry whereby the interns will actually spend a specified time working in and for that industry.

The existing educational institutions can take care of training well equipped young men prepared for full-time work in industry at the present rate of demand. Up to the present, however, that demand has not been nearly large enough, and there are even now large industrial concerns which seem to be perfectly satisfied with second rate medical care for their employees. I know of one industrial plant, employing approximately 14,000 men, where the medical staff consists of one full-time physician. Preemployment examinations in this plant are done by a man who really started as a first aid worker; he told me rather proudly that he could do over 300 physical examinations a day! A situation of this sort certainly seems to be out of step with the general trend. According to the National Industrial Conference Board, the per capita cost for medical care in industry between 1915 and 1938 rose in almost a steady curve from 88 cents to \$6.15. I cannot feel that industry has become so paternalistic and altruistic that it would continue such a policy without expecting something in the way of return on that investment.

While on the subject of finance one should not attempt to dodge the issue that in the budget of any medical department in industry salaries probably represent the largest item. It is not too difficult to arrive at a wage rate for a nurse or x-ray technician which will correspond reasonably well with the general level existing in the community. As to how much a full-time physician in industry is worth, there seems to be a decided lack of unanimity. If a full-time physician in industry contents himself with bandaging fingers and dispensing pills, he probably is not worth much to that industry, but if he is willing to tackle his job with the same enthusiasm, the same level of intelligence and healthy curiosity shown by the specialists in any other line, his financial reward should be in proportion. Industry must prepare to pay for a specialist if it wishes the advice and services of a specialist. If industry pays for a finger bandager or a pill pusher, that is just what industry will get.

To the operator of the small industry the establishment of a high powered medical department with a full-time physician is obviously out of the question. How is the manager of the small concern to provide adequate medical care for his employees without a disastrous financial outlay? As I see it, there are two solutions to this problem: in the first place, the services of a true industrial physician could be shared with other concerns. This can be and has been done with great success, and I need only refer the unbeliever to the experience of Dr. Frank Griffin in Toronto as reported in the *Canadian Public Health Journal* for November 1939. Here one can read how one physician was able to take over the medical care in several small plants, do the physical examinations, arrange for nursing service and oversee the general plant hygiene. I know of several situations in this country where a similar arrangement is in operation. The other solution which can be used in

any community, regardless of its size, is to make use of the general practitioner who is already on the job. Almost all industrial concerns, especially the small ones, seem to have particular physicians on whom they call when emergencies arise. It may be that the physician called is the only one in town. The point which I wish to emphasize is that in far too many cases the poor physician is not consulted until after the accident has occurred. I have no desire to turn every doctor into a safety engineer; nevertheless what a superior arrangement it would be for all concerned if that small industry and the doctor could get together on a plan for regular medical supervision of all matters pertaining to the health of the employees; let them start regular pre-employment examinations and, even better, periodic examinations. Details of this plan would, of course, have to be adapted to the particular circumstances. It might mean one morning or part of a morning a week for physical examinations and one morning every month or so for a general plant inspection. I am sure that even a small industry would reap a generous return from any money expended in this direction. Here, I feel, lies the real opportunity for physicians in industry. Here lies the way of bringing improved medical care to the greatest number of individuals.

Obviously an industry must exercise a certain amount of judgment in naming the doctor to carry out a program of this sort. I am convinced that the majority of general practitioners who are honest would welcome a closer intimacy with industry. They will produce the argument, however, that they have no training in industrial work and would not have any idea how to go about it. Already twenty-nine states in their state governments have set up departments which are interested primarily in industrial hygiene. The state medical associations are a jump ahead and thirty-four of these societies now have committees on industrial health. These various groups are continually increasing the scope of their activities as well as increasing in number. These are the groups that stand ready to assist the general practitioner as he embarks into the somewhat bewildering and complex field of industrial medicine. Of course there are opportunities for physicians in industry. They exist in nearly every consulting room in the country. They exist in nearly every industry in the country, large or small. They exist somewhere in the family life of the majority of the people in this country. They await only recognition, but they must be recognized jointly by industry and by the medical profession. It can be only when these two groups join hands that these opportunities can be fully realized. A lot of missionary work and a lot of pioneer work remain to be done.

920 Western Avenue.

ABSTRACT OF DISCUSSION

DR. M. N. NEWQUIST, New York: These opportunities exist primarily for rendering an unbiased constructive medical service to the employer and to the employee and they should not be converted into a means for soliciting patients. Fortunately there has been very little abuse of these opportunities. The opportunity to render medical service in industry should be considered in its preventive, administrative and curative phases. Include visits to the plant at regular intervals, participate in the control of sanitation and in the administration of benefit plans where health is involved. It is a job in "human engineering" from start to finish. I know of no better human engineer than the doctor. Progress in industrial medicine will continue to be slow until more employers provide the opportunity. Doctors cannot go into a plant uninvited.

On the other hand, employers are not willing to embark on a health program without being reasonably assured that it will justify its cost. Actual demonstrations by physicians that good industrial medical service will pay dividends is the best way to educate employers. A "speed up" in the progress of industrial medicine is in the offing with the more widespread teaching by medical schools, the American Medical Association and other medical organizations of industrial medicine in all its phases including industrial toxicology, occupational disease and engineering methods for their control. The practice permitting first aid men and other nonqualified persons to make physical examinations of employees should be discontinued. The general practitioner will continue to play an important role in serving the numerous small industrial establishments widely scattered throughout the country. He can cope with most of the medical situations which arise in the average plant. In the relatively few obscure problems it is the part of wisdom anyhow to call in a qualified consultant. If employers would abandon the "cash and carry" method for obtaining medical service and would charge their plant physicians with appropriate responsibility for engineering the health of their human machinery, the whole complexion of the field of industrial medicine would assume a more healthful hue.

ACUTE APPENDICITIS IN CHILDREN

A CLINICAL STUDY OF MORE THAN 1,000 CASES

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There is probably no one subject in the entire field of surgery that has aroused more widespread interest among the public and the members of the medical profession than that of acute appendicitis and its complications. Yet the very fact that at this session the American Medical Association is devoting a symposium to this topic, even though more than half a century has elapsed since the pioneer work of Reginald Fitz, seems proof enough that there remains a good deal of uncertainty, at times, as to methods of management of the patient with appendicitis. Much progress, nevertheless, has been made and is being made, especially as the result of careful clinical studies in large series of cases. Too often, however, papers have been written on evidence obtained by a review of hospital records rather than from personal observation of patients, and therefore the conclusions drawn have sometimes not been as reliable as they should be. Too often, also, statistics have been published as to the effectiveness of treatment without clear differentiation between perforations of the appendix which clinically have remained localized (with a definitely palpable mass) and those which have obviously involved the open peritoneal cavity.

We submit here the result of what we consider a careful personal clinical study of well over 1,000 cases of acute appendicitis and its most frequent complications observed by us at the Children's Surgical Ward of the Cook County Hospital, Chicago, during a little more than four years, hoping that from it certain conclusions

From the Surgical Service of the Cook County Hospital and Rush Medical College.

Read before the Section on Surgery, General and Abdominal, at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

may be drawn which will be helpful in clarifying the still existing uncertainty as to reliable indications for and against operative intervention.

CLASSIFICATION AND TREATMENT

During the past twenty-odd years of surgical practice it has gradually become apparent to us that, from a clinical point of view, patients with acute appendicitis and its most common complications, whether children or adults, fall naturally into one of three fairly clearcut, fairly well defined groups, and we feel that it is highly important for one to decide, or at least to attempt to decide, into which of these each patient belongs, as this decision may materially influence the course of treatment.

GROUP 1.—This group comprises all patients who are obviously suffering from an attack of acute appendicitis before the stage of perforation. It seems hardly necessary here to elaborate in detail either on the usual "textbook" picture or on the difficulties that may arise in making a diagnosis when the atypical case is encountered. Suffice it to say (for the purpose of this discussion) that we believe it to be the consensus today that appendectomy as soon as the diagnosis is made is the treatment of choice, except for those patients in whom the attack is definitely subsiding. In our study there were 629 patients in this group, all of whom were successfully operated on without a single death. Would that every patient when first seen by the surgeon could be included in this group.

GROUP 2.—In this group a longer duration of symptoms is noted. The characteristic clinical observations are obviously those associated with a perforation of the appendix against which there has been set up from the time of perforation an adequate local defensive mechanism. A careful history will usually show that the patient has been sick for several days, perhaps a week or ten days or even longer. He does not as a rule appear desperately ill. The fever may be fairly high and the leukocyte reaction well marked, but he does not have an anxious expression, nor is he suffering intense pain. On abdominal examination with the patient relaxed and the thighs held in flexion, one can make out by palpation the margins of a definite mass, varying in size from that of a walnut to that of an orange or perhaps even a small grapefruit and varying considerably also in position. Though it usually occupies the right lower quadrant, it may be felt well into the right flank; sometimes it is in the left lower quadrant, and not infrequently it is deep in the pelvis, where it can be made out only with the finger in the rectum. Occasionally it is so deeply situated in the main abdominal cavity and so covered by large tense abdominal muscles that its presence is made certain only after complete relaxation induced by an anesthetic, and in extremely rare instances it may not be discovered until after the incision has actually been made and the walled-off process seen with the naked eye or felt with the examining finger. The point we wish to make is this: Whatever its size, whatever its position and however its presence may be detected, it represents pathologically a slow leak from the appendix, which has become effectively sealed off from contact with the open peritoneal cavity.

As to the treatment of the patient in this group, we are well aware that there is still a considerable difference of opinion even among competent surgeons. Many feel that the majority, if not all, of these so-called appendical abscesses should be drained early, and some even go so far as to advocate a serious attempt at removal of the

appendix at the same time. With this attitude we cannot agree; such a policy is neither safe nor necessary. It is not safe, because, if between the wall of that palpable mass and the parietal peritoneum there are normal loops of bowel, spreading peritonitis is apt to be produced by the attempt at drainage; it is not necessary, because in the vast majority of cases the mass will spontaneously disappear. Our study furnishes ample evidence to prove that with more than 90 per cent of these patients careful observation over a period of days will reveal a gradual improvement in the clinical picture, a gradual reduction in the temperature and the leukocyte count, a progressive diminution in the size of the inflammatory mass and, finally, after perhaps ten days to four or five weeks, its complete disappearance, as far as one can tell by physical examination. We advise these patients to return to the hospital after approximately three months, when they are feeling perfectly well. The appendix may then safely be removed, no matter how densely it may have been involved in adhesions. Only a few cases in this group (in our experience) will take the opposite course, with a progressive aggravation of the clinical picture and a progressive enlargement of the palpable mass to the stage at which it represents unquestionably a real "abscess." Under these circumstances it will have definitely tried to point somewhere, either anteriorly against the parietal peritoneum, where it can easily and safely be drained through what amounts to an extraperitoneal approach, or downward more deeply into the true pelvis, where it can be felt as a soft bulging mass against the anterior wall of the rectum and where it has a fair opportunity to break through spontaneously without the aid of surgical intervention. In our study, 228 patients have been classed in this group. Of these, twenty-five were operated on for drainage, but I am sure that for some of these the procedure was not necessary, and a longer period of observation would doubtless have shown this to be true. All of the others (203) were given the benefit of watchful conservatism, and of these 198 recovered, a mortality of only 2.5 per cent.

GROUP 3.—In contradistinction to those in groups 1 and 2 the cases included in group 3 represent acute perforations of the appendix into the open peritoneal cavity, perforations against which there has at no time been established an adequate defense. Pathologically speaking, in many of them the condition is of the obstructive type, with a large fecal stone, and the perforation is grossly of considerable size. To use a crude simile, it is not unlike a sudden "blowout" of a tire, in contrast to a slow leak. Often the streptococcus is the predominant organism, and often too the patient's resistance to infection is low. As a rule he looks very sick; there is a pinched, anxious expression; the tongue is dry; the pulse is fast, and the fever and leukocyte count are variable. The knees are held in flexion; the breathing is thoracic; the abdomen is distended; on palpation one finds the muscles everywhere tense, and there is more or less general tenderness, at times even in the left flank. The whole picture is suggestive of spreading peritonitis.

What shall we say as to the care of this patient? Has he a better chance to recover if he is not operated on and use is made of the so-called Ochsner method of treatment, with Fowler's position, adequate physiologic solution of sodium chloride and dextrose given by vein and under the skin, restriction of fluid by mouth, a Levine tube for relief of distention, and administration of mild sedatives, in the hope of diminishing

peristalsis and perhaps of localizing the spreading infection? Without question, a number of surgeons hold this view (many of prominence among them), and it would take a bold critic to claim that such measures are not of great value. But we would ask these surgeons: Would they apply this conservative regimen to all patients in this group or to only a few? And if to only a few, to which ones? Would they apply it only in the late stages or in the early ones as well? Would they apply it only to patients with evidence of widespread involvement of the peritoneum or to those also in whom the infection is apparently limited? We have often heard it said that if the patient has been sick for less than forty-eight hours he should be operated on; if for more than forty-eight hours, operation will be withheld. Some place the limit of time at even less; others would arbitrarily fix it at fifty-six hours or even more. To these points of view we humbly and in all seriousness express our belief that no physician, however wise he may be, can hope to judge accurately the rapidity of pathologic changes; no physician, even from the most carefully obtained history (especially with children) can be certain as to the exact duration of the attacks of appendicitis (which is so often preceded or accompanied by other things which cloud the picture); no

finally, use of a measure which has lately been emphasized by Gatch and his associates and has been used by us empirically for a long time, i. e. replacement of lost plasma protein (both before and after operation) by means of blood transfusion.

As to the technic of the operative procedure for patients in this group, perhaps little need be said. The McBurney incision is almost always employed. Cultures are always made of the free pus when the peritoneum is opened. The Poole suction tip has practically replaced the use of sponges in the abdominal cavity. The perforated appendix is delivered with a Babcock forceps, which encircles its wall; the stump is always ligated with catgut and whenever possible is buried beneath a catgut purse string. As to the matter of drainage, there is still considerable difference of opinion among our own group as to its value. Some are bold enough to close these incisions without a drain. (We have had occasion several times to open these incisions later to allow free evacuation of foul-smelling pus, and in one instance, in which a diffuse anaerobic phlegmon of the entire right abdominal wall had developed subsequent to a tight closure, we were obliged to reflect enormous flaps of skin to expose the area involved to the open air.) A few prefer to close the peritoneum

Summary of Cases of Acute Appendicitis (Children's Surgical Ward, Cook County Hospital)

	Group 1							Group 2							Group 3						
	Without Perforation							With Perforation and Localized Palpable Mass							With Perforation and Spreading Peritonitis						
	1934	1935	1936	1938	1939	1940	Total	1934	1935	1936	1938	1939	1940	Total	1934	1935	1936	1938	1939	1940	Total
Number of cases (1,163) ..	111	86	99	153	126	54	629	59	32	40	37	46	14	228	67	57	39	45	61	37	306
Operative treatment.....	111	86	99	153	125	54	629	5	6	4	8	1	1	25	54	55	33	41	61	37	281
Recoveries.....	111	86	99	153	126	54	629	4	6	4	7	1	1	23	46	46	29	33	57	34	242
Deaths.....	0	0	0	0	0	0	0	1	0	0	1	0	0	2	8	9	4	8	4	3	36
Mortality, %.....	0	0	0	0	0	0	0	20	0	0	12.5	0	0	8	14	16	12	19.5	6.5	8.1	12.8
Conservative treatment.....	0	0	0	0	0	0	0	54	26	36	29	45	13	203	13	2	6	4	0	0	25
Recoveries.....	0	0	0	0	0	0	0	50	26	36	29	44	13	198	5	0	0	0	0	0	5
Deaths.....	0	0	0	0	0	0	0	4	0	0	0	1	0	5	8	2	6	4	0	0	20
Mortality, %.....	0	0	0	0	0	0	0	7	0	0	0	2.2	0	2.5	61	100	100	100	0	0	80

physician can always be sure of the exact time when the perforation has occurred, nor can he be certain, even by the most painstaking examination, of the extent of involvement of the peritoneum by the spreading infection. If these statements are true, why should one allow such unreliable criteria as these to influence one as to the decision for or against surgical intervention?

The answer is that one should not. We are of the firm opinion that those who advocate a conservative course with patients in this group are wrong, because it appears to us that the essence of the treatment should consist in removal of the ruptured appendix, which closes the leak through which a constant stream of infected material is being fed into the peritoneal cavity. Just as with an open perforation of a duodenal or a gastric ulcer, the essential thing is to close the opening as soon after it occurs as possible. With us there has been, therefore, an ever increasing tendency over a period of years to apply this policy of immediate operation to practically all patients in this group, no matter how much time seems to have elapsed since the onset of illness, and we are more and more convinced of the wisdom of this course. We do not, however, wish to give the impression that when we use the term "immediate operation" we mean that the patient is sent from the admitting room to the operating table, for long since we have seen the value of adequate preparation, with restoration of the electrolyte and fluid balance, relief of distention as far as possible with a Levine tube and,

and drain only the incision itself. We believe, as do most other surgeons, that it is not mechanically possible completely to drain the infected peritoneal cavity by the introduction of one or more tubes, yet we continue to use drainage in every case of perforation, always employing drains of the soft cigaret type and always placing them as near the source of the infection as possible. Especially do we feel that they are of value when the perforation has occurred behind the cecum, because they may help to prevent an ascending infection in tissues not protected by peritoneum and thus minimize the likelihood of a subphrenic abscess.

With what success has this regimen been rewarded? A glance again at the accompanying table will show that in this period of a little over four years 306 patients have been classed in group 3. Of these, only twenty-five (8 per cent) were treated conservatively, with a mortality of 80 per cent, whereas 281 (90 per cent) were given the benefit of "immediate" operation, with 242 recoveries (mortality, 12.8 per cent). It will also be noted that in the past two years all patients were operated on, no matter how much time had followed perforation.

CONCLUSIONS

1. Immediate appendectomy is indicated in all cases of acute appendicitis before perforation unless the attack is clearly subsiding.

2. When the clinical evidence shows that the appendix is ruptured and the infection is definitely localized

(demonstrable by a palpable mass), a conservative course is indicated. Only a few patients will need surgical drainage.

3. In all cases in which spreading peritonitis is present without evidence of localization, it is a wise plan to remove the source of the infection as early as possible, institute proper surgical drainage and make every effort postoperatively to restore to the circulating blood whatever elements have been reduced as the result of the infection.

THE MORTALITY FROM ACUTE APPENDICITIS IN THE JOHNS HOPKINS HOSPITAL

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It is well known that death seldom follows the competent removal of an acutely inflamed but unperforated appendix.¹ At present, however, surgeons disagree as to the proper treatment of patients having acute appendicitis with one or more complications. Our own uncertainty led us to study the results of the treatment of acute appendicitis as carried out in the Johns Hopkins Hospital.

In the surgical service of the Johns Hopkins Hospital patients considered to have acute appendicitis in any stage of the disease are subjected to immediate operation. From Sept. 1, 1931, to Sept. 1, 1939, 1,317 of these patients had acute appendicitis. All cases in which there was no gross perforation of the appendix are classified under simple acute appendicitis. All those in which perforation of the appendix was found at operation (except those in which rupture was caused by handling during operation) are divided into two groups:

1. Appendicitis with perforation and abscess formation.

2. Appendicitis with perforation and peritonitis.

No attempt has been made to distinguish between "local," "spreading" and "generalized" peritonitis. We agree with Ladd,² who stated that "no surgeon really

were found to have perforation of the appendix by the time they sought treatment in this hospital and that it was this group in which the deaths occurred. Although 90 per cent of these patients recovered, many seemed clinically just as ill on admission as some who died. In an effort to find out whether it was the treatment employed at this hospital or some other factor which was responsible for the different outcome, we have made a study of the forty-eight fatal cases.

TABLE 2.—Chief Causes of Death

Cause of Death	No. of Cases	Autopsy
Direct complications of appendicitis		
Generalized peritonitis	13	11
Pylephlebitis	4	2
Septicemia	1	0
Inadequate treatment	14	9
Extra-appendiceal complications		
Cerebral accident	1	0
Pulmonary embolism	3	2
Pneumonia	4	2
"Poor risk" patients	4	3
Cause of death uncertain	4	2
Total	48	31

In table 2 we have listed the chief causes of death. These fall into several well defined groups (tables 3 to 9 inclusive). Postmortem examination was made in thirty-one of the forty-eight cases.

TABLE 3.—Group 1 (Death from Acute Generalized Peritonitis Less than Seventy-Two Hours After Operation)

Case	Race, Sex, Age	Duration of Symptoms	Operative Diagnosis	Postoperative Course, Hours	Autopsy
1	W ♂ 2	36 hr.	Peritonitis	20	Generalized peritonitis
2	W ♀ 2	5 days	Peritonitis	30	Generalized peritonitis
3	W ♂ 2	4 days	Peritonitis	36	Generalized peritonitis
4	C ♀ 6	3 days	Peritonitis	12	Generalized peritonitis
5	C ♂ 7	3 days	Peritonitis	12	Generalized peritonitis
6	C ♂ 8	4 days	Peritonitis	70	No autopsy
7	C ♂ 9	3 days	Abscess	44	Generalized peritonitis
8	C ♂ 21	3 days	Peritonitis	40	Generalized peritonitis
9	C ♂ 41	7 days	Peritonitis	16	Generalized peritonitis
10	C ♀ 47	10 days	Peritonitis	6	Generalized peritonitis
11	C ♀ 48	7 days	Peritonitis	12	No autopsy
12	C ♂ 50	5 days	Peritonitis	60	Generalized peritonitis
13	C ♂ 50	14 days	Peritonitis	12	Generalized peritonitis

Material for culture was taken in a routine manner both at operation and at autopsy. Colon bacilli and streptococci were commonly found, but *Clostridium welchii* was found only twice. It is interesting to note that ten of these thirteen patients were Negroes.

It is not known why some patients die of peritonitis, whereas others, with apparently the same kind of infection and degree of illness, recover. In only one of these cases was there any localization of the peritonitis. The resultant spread of the peritonitis in this case may possibly be ascribed to the operative procedure.

TABLE 4.—Group 2 (Death from Pylephlebitis with Multiple Abscesses of the Liver and Septicemia)

Case	Race, Sex, Age	Duration of Symptoms, Days	Operative Diagnosis	Postoperative Course	Autopsy
1	C ♂ 11	5	Abscess	36 days	Pylephlebitis; multiple liver abscesses; septicemia
2	C ♂ 34	4	Peritonitis	20 days	No autopsy
3	W ♀ 56	6	Abscess	67 days	Pylephlebitis; multiple liver abscesses; septicemia
4	W ♀ 58	5	Peritonitis	48 hr.	No autopsy

TABLE 1.—General Summary of Results

Condition	No. of Patients	Deaths	Per Cent
Simple acute appendicitis	838	0	0
Appendicitis with perforation and abscess	283	20	7.06
Appendicitis with perforation and peritonitis	196	28	14.23

knows how diffuse the process is unless he has done a very improper operation." Table 1 summarizes the results.

It will be seen from this table that more than one third of the patients suffering from acute appendicitis

From the Department of Surgery, the Johns Hopkins University School of Medicine.

Read before the Section on Surgery, General and Abdominal, at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

1. Johnson, L. W., and Boone, H. R.: The Navy and Appendicitis, U. S. Nav. M. Bull. 35: 41 (Jan.) 1937. Bliss, R. W., and Heaton, L. D.: Appendicitis in Army Service: Report of 2,100 Cases, Ann. Surg. 107: 242 (Feb.) 1938.

2. Ladd, W. E.: Immediate or Deferred Surgery for General Peritonitis Associated with Appendicitis in Children, New England J. Med. 219: 329 (Sept. 8) 1938.

As the first of these patients had severe chills prior to operation, he probably had pylephlebitis before the appendix was removed. The diagnosis of pylephlebitis in the second case was substantiated by laparotomy, which disclosed multiple abscesses of the liver. This patient was deeply jaundiced, and colon bacilli were repeatedly cultured from his blood. The fourth patient was deeply jaundiced on admission.

In group 3, one patient died with peritonitis, septicemia and leukopenia. This patient, a 37 year old Negress, had generalized peritonitis found at operation five days after onset of symptoms. A heavy growth of *Bacillus coli* was obtained from samples of blood taken preoperatively and postoperatively. The marked and persistent leukopenia (leukocyte count, 3,400 to 7,600 per cubic millimeter), with a normal differential count, probably indicated a poor response on the part of the patient to an overwhelming infection. Death occurred five days after operation. Repeated transfusions failed to influence the leukopenia. There was no autopsy.

TABLE 5.—Group 4 (Death from Complications Inadequately Treated)

Case	Race, Sex, Age	Duration of Symptoms	Operative Diagnosis	Postoperative Course, Days	Autopsy
1	C ♂ 8	36 hr.	Peritonitis	5	Mechanical ileus involving lower part of ileum
2	C ♂ 33	4 days	Abscess	5	Mechanical ileus involving lower part of ileum
3	W ♂ 23	4 days	Peritonitis	8	Mechanical ileus involving lower part of ileum
4	W ♀ 10	2 days	Peritonitis	23	Mechanical ileus involving terminal part of ileum; generalized peritonitis
5	W ♂ 9	3 days	Peritonitis	23	No autopsy
6	C ♂ 11	6 days	Abscess	7	No autopsy
7	C ♂ 33	2 days	Peritonitis	10	No autopsy
8	C ♂ 20	48 hr.	Peritonitis	20	Left subphrenic abscess with extension through diaphragm; multiple lung abscesses
9	C ♂ 55	36 hr.	Peritonitis	37	Right subphrenic abscess with extension through diaphragm and into liver; multiple lung abscesses
10	C ♂ 43	8 days	Abscess	45	Left subphrenic abscess with extension through diaphragm; multiple lung abscesses
11	W ♂ 16	5 days	Abscess	26	No autopsy
12	C ♀ 10	5 days	Abscess	25	No autopsy
13	W ♂ 43	2 days	Abscess	72	Rectovesical fistula; cystitis; pyelonephritis
14	C ♂ 20	10 days	Abscess	9	Generalized peritonitis

The most frequent complication in group 4 was mechanical ileus, which caused seven deaths. It is often difficult to distinguish between mechanical and paralytic ileus. The latter commonly accompanies peritonitis and responds well to conservative treatment, whereas delay in the relief of mechanical ileus is fatal. When the surgeon can make the diagnosis of mechanical ileus he is still faced with the difficult problem of dealing with the obstruction. Whether to perform simple enterostomy or to release the obstructed bowel in any given case requires nice judgment. The seven cases of mechanical ileus in this group represent failures. In cases 1 and 2 the mechanical nature of the obstruction was recognized late, and an enterostomy was performed only a few hours before death. The fact that patient 3 had a mechanical obstruction was unrecognized until postmortem examination was made. In cases 4 and 5 the fatalities resulted from the complications of surgical procedures designed to relieve the

obstruction directly. In case 4 a laparotomy was performed sixteen days after the appendectomy. The lower part of the ileum was badly traumatized in freeing dense adhesions, necessitating a resection. This procedure failed to relieve the obstruction and also caused a secondary flare-up of peritonitis. In case 5 a laparotomy with release of adhesions was performed eight days after appendectomy and again two days later. The patient stood these procedures satisfactorily. Disruption of the wound occurred, in the course of which a high loop of jejunum was traumatized by contact with a through and through stay suture, producing a high intestinal fistula. There was no postmortem examination in the sixth and seventh cases, but a review of the clinical record leaves no doubt that the cause of death was an unrecognized mechanical ileus in both instances.

The course of events in the next five cases in this group was almost identical. The patients all did well at first, but later subphrenic abscesses developed, which were not recognized clinically. In each instance the abscess perforated through the diaphragm into the lung, causing fatal pulmonary abscesses. In case 11 there was no postmortem examination but there is little doubt as to what occurred. The patient had had abnormal physical signs at the base of the right lung for several days. Suddenly he began coughing up great quantities of foul pus in which the colon bacillus was the predominant organism. He became cyanotic and rapidly weaker and died in a few hours. Study of the clinical record suggests that patient 12 also had an unrecognized right subphrenic abscess.

In the thirteenth case the bladder was entered in an attempt to drain a pelvic abscess through the rectum. A persistent rectovesical fistula formed and resulted in a fatal ascending infection of the urinary tract. The last patient in this group entered the hospital with urinary symptoms. He was found to have a pelvic abscess lying against the bladder. This was drained through the abdominal wall, no attempt being made to remove the appendix. The patient progressed well for seven days, when generalized peritonitis suddenly developed and he died in forty-eight hours. Post-mortem examination showed the pelvic abscess nearly healed, but there was also a smaller abscess about the perforated appendix in the right lower abdominal quadrant. This untreated abscess had ruptured into the general peritoneal cavity.

In group 5, one patient died as a result of a cerebral accident. This patient, a white woman aged 67, had an appendical abscess at operation ten days after the onset of symptoms. She seemed to be progressing favorably for twenty-four hours after operation, when she suddenly lost consciousness; bradycardia and bradypnea developed, and she died within an hour. There was no autopsy.

TABLE 6.—Group 6 (Death from Massive Pulmonary Embolism)

Case	Race, Sex, Age	Duration of Symptoms, Days	Operative Diagnosis	Postoperative Course, Days	Autopsy
1	W ♂ 75	14	Abscess	14	Thrombi in right pulmonary artery
2	C ♂ 49	3	Abscess	10	Emboli in pulmonary arteries
3	W ♀ 35	8	Abscess	14	No autopsy

All of these patients were convalescing uneventfully until the sudden onset of the fatal complication.

TABLE 7.—Group 7 (Death from Pneumonia)

Case	Race, Sex, Age	Duration of Sym- ptoms, Days	Operative Diagnosis	Postop- erative Course, Days	Autopsy
1	W ♂ 13	5	Peritonitis	4	Bilateral bronchopneumonia, pneumococcus type 2
2	C ♀ 52	3	Peritonitis	6	Pneumonia and atelectasis
3	C ♂ 45	4	Peritonitis	3	No autopsy
4	W ♂ 55	5	Abscess	4	No autopsy

All of these patients appeared to improve for twenty-four to forty-eight hours after operation and then suddenly became critically ill, with clinical signs and x-ray evidence of pneumonia. It is interesting to note that two of the patients were operated on under spinal anesthesia; ether by open drop was used for the third and local infiltration anesthesia for the fourth. These deaths occurred before the introduction of sulfa-pyridine.

TABLE 8.—Group 8 (Death Due to Poor General Condition Prior to Onset of Appendicitis)

Case	Race, Sex, Age	Duration of Sym- ptoms	Operative Diagnosis	Postop- erative Course	Autopsy
1	W ♂ 57	24 hr.	Abscess	4 hr.	Addison's disease; tubercu- losis of both adrenals
2	W ♂ 75	2 days	Abscess	12 days	Diabetes mellitus
3	C ♂ 55	6 days	Abscess	5 days	Diabetes mellitus
4	W ♀ 70	7 days	Abscess	5 days	No autopsy

The first patient was being unsuccessfully treated for Addison's disease when his symptoms of appendicitis began. His blood pressure, already low, fell further before operation and continued to drop after operation despite vigorous treatment. Patients 2 and 3 had severe diabetes mellitus which was difficult to control. Postmortem examination in each instance failed to show any definite cause of death, leading us to conclude that the general debility of these patients, together with their diabetes, rendered them unable to withstand the local infection and paralytic ileus incident to their condition. The fourth patient was a frail old woman who had had a laparotomy with hysterectomy many years previously. Old dense adhesions were found when the abdomen was opened, and the ileum was torn in the process of removing the appendix and draining the abscess. The operative procedure was long, but at first the patient seemed to do well. A fecal fistula developed three days after operation, and signs of pneumonia were observed on the following day. There was no evidence of ileus or peritonitis. No postmortem examination was made. It can be reasonably argued that this patient died as a result of too much surgical treatment. On the other hand, had the patient been younger and stronger or had there not been the technical difficulty resulting from the earlier operation, death might not have occurred.

TABLE 9.—Group 9 (Death from Obscure Causes)

Case	Race, Sex, Age	Duration of Symptoms	Operative Diagnosis	Postop- erative Course, Days	Autopsy
1	W ♂ 48	24 hr.	Peritonitis	4	Healing pelvic peritonitis
2	W ♀ 49	4 days	Peritonitis	7	No autopsy
3	W ♀ 60	14 days	Abscess	6	No autopsy
4	C ♂ 26	5 days	Abscess	12	Healing peritonitis

The first patient was considered clinically to have had pneumonia following operation. This was not verified at postmortem examination, nor was anything

found to explain his death. The second patient was very obese. There was a persistent high fever after operation but no clinical evidence of peritonitis or ileus. She too was thought to have pneumonia. Post-mortem examination was not made. The third patient appeared to improve after operation, but four days later azotemia developed; the patient became comatose and died on the sixth postoperative day. The clinical record of this patient does not justify any conclusion as to the cause of death. The fourth patient was very ill on admission and was thought to have mechanical ileus. In addition to appendectomy, an ileostomy was performed. The patient improved considerably for one week and then began to bleed profusely from the ileostomy wound. The bleeding decreased on removal of the enterostomy tube, but the patient became jaundiced after a severe transfusion reaction. Again he seemed to improve for a few days; then he died suddenly, without showing any new symptoms or signs. Postmortem examination did not furnish any explanation for his death. The typical lesions of mismatched transfusion were not found.

COMMENT

A number of recent papers have dealt with such technical matters as the choice of an anesthetic agent, the type of incision to be used, the manner of dealing with the appendical stump and the advantage of high ligation of the appendical vein. The principles of treatment are more important than the details. The anesthetic agent must be suited to the individual patient. A small muscle-splitting incision is adequate in most instances and will cause little trauma and spread of the infection, but we do not hesitate to use other types of incision when the need exists. Whether the stump of the appendix should be ligated and/or inverted depends on the operator's judgment in any given case. In our series of appendectomies there was no resultant abscess at the site of inversion, nor did a fecal fistula fail to heal spontaneously in a patient who survived. Only four of our patients had pyelphlebitis, and two of these had it before operation. More harm would result from attempts to secure high ligation of the appendical vein than from the ordinary procedure. The use of drains is open to question. We have employed drainage as a matter of routine when pus was present but have come to feel that the presence of drains may in some instances produce the adhesions which cause mechanical ileus. We are not prepared to say whether this danger is greater than that of the complications which might arise if drainage were not employed.

The most controversial subject which has arisen with regard to appendicitis is the so-called delayed or expectant treatment of perforative appendicitis. We feel unequivocally that this is poor treatment and that advocacy of this method has had an unfortunate effect on the general practitioner. In the first place, the most experienced surgeons are at times unable to determine with accuracy whether or not an acutely inflamed appendix has perforated. Granted that a patient has signs of peritonitis, it is not always possible to know the cause before operation. We are not alone in having discovered through a McBurney incision that peritonitis may be due to perforation of a peptic ulcer, to Meckel's diverticulum or to an infected diverticulum of the sigmoid flexure of the colon. In the past two years one of us has operated in three cases of primary pneumo-

coccic peritonitis, having made a preoperative diagnosis of perforative appendicitis. The correct diagnosis, made at operation, permitted treatment with specific serum and sulfapyridine, with prompt recovery. Rhodes³ kept a careful record of preoperative diagnoses made by a number of examiners and found that they were from 34 to 53 per cent incorrect with reference to the local pathologic condition, position of the appendix and extent of peritonitis. Selection of cases for delayed treatment on the basis of such predictions seems hazardous, to say the least.

Advocates of delayed treatment postulate that delay in operation affords a better opportunity to the body mechanism for defense against the infection. Doubtless the principle of physiologic rest for the affected tissues is as important here as in other parts of the body, and certainly handling and operative trauma should be minimized. We believe, however, that the first step in treatment should be elimination of the source of infection. This principle is not questioned in dealing with other perforative lesions of the gastrointestinal tract. Putting the gastrointestinal tract at rest with sedatives and restricting the diet, with the use of continuous gastric or duodenal drainage and intravenous fluids, are essential adjuncts to the treatment of appendicitis. In support of this statement we submit the figures in a series of cases observed in this hospital prior to 1931, before continuous suction and intravenous fluids were commonly used. In a series of eighty-five consecutive cases of perforative appendicitis treated in this hospital during the years 1928 to 1931 there were sixteen deaths, a mortality rate of 18.8 per cent. This is nearly twice that of our present series. The only real differences in treatment in the two series were the institution of suction and the administration of intravenous fluids in the cases making up the present series.

It has been argued that operation on an appendiceal abscess often spreads infection. In our series 283 patients with appendiceal abscess were subjected to immediate operation. In only two of them did spreading peritonitis cause death, and in one of these two the outcome was due to our failure to recognize and deal with the primary appendiceal abscess. In the other case it is not certain whether the spread of infection occurred before, during or after operation.

Another disadvantage of conservative treatment of perforative appendicitis is the fact that the appendix has not been removed when the patient recovers. It is often difficult to persuade a well person to have an appendectomy. This fact is shown by the reports on this method of treatment; a return to the hospital for appendectomy is secured at best in only 50 per cent of the patients. It is well known that further attacks of appendicitis will follow the first, and, in our experience, of forty-three patients in whom the appendix was not removed at the first operation, eight returned with a second attack of perforative appendicitis.

Finally, a comparison should be made of the mortality rates following the two methods of treatment. We are unable to do this satisfactorily, since no adequate basis for comparison can be established. The various advocates of the conservative method of treatment differ among themselves as to the selection of cases for that type of treatment. The mortality rates

reported by some⁴ vary from 8.1 per cent to almost 20 per cent for the series of cases selected for conservative treatment. The general average for the group is about 14 per cent. Patients entering the hospital in a moribund condition are often not included in the statistics of these reports, whereas all patients have been included in our series. The general mortality rate in our series is lower than the average rate for delayed treatment and is nearly as low as that of the most carefully selected series of cases. When we remember that many of the deaths in our series might have been prevented by better diagnosis and treatment, we feel justified in attempting to improve our mortality rate by more careful study and by better treatment of complications, rather than by adopting the method of delayed treatment.

SUMMARY

In a series of 1,317 consecutive cases of acute appendicitis, in all of which the condition was treated by immediate operation, perforation of the appendix with either abscess or peritonitis was found in 479. There were no deaths in the 838 cases in which perforation had not occurred. There were forty-eight deaths in the group of 479 cases, a mortality rate of 10 per cent. A study of the fatal cases leads us to conclude that some of these deaths should have been prevented by more careful diagnosis and better treatment of the post-operative complications. Even so, the mortality rate in our series is lower than the average reported for the delayed or expectant treatment of perforative appendicitis. For this reason and for the other reasons given we feel justified in continuing to perform immediate operation in the treatment of appendicitis.

4. Gardner, C. E., Jr.: The Conservative Management of Appendiceal Peritonitis, *South. M. J.* 32: 157 (Feb.) 1939. Kirtley, J. A., Jr., and Daniel, R. A., Jr.: Acute Appendicitis: Study of 1,000 Consecutive Patients, *Surgery* 2: 215 (Aug.) 1937. Sperling, Louis, and Myrick, J. C.: Acute Appendicitis; Review of 518 Cases in University of Minnesota Hospital from 1932 to 1935, *ibid.* 1: 255 (Feb.) 1937. Collier, F. A., and Potter, E. B.: Treatment of Peritonitis Associated with Appendicitis, *J. A. M. A.* 103: 1753 (Dec. 8) 1934. Walker, I. J.: Immediate or Deferred Surgery for General Peritonitis Associated with Appendicitis in Adults, *New England J. Med.* 219: 323 (Sept. 8) 1938.

Wolf-Children.—In his presidential address on this subject delivered before the Folk-Lore Society on February 21 . . . Dr. J. H. Hutton deals with the cases recorded from classical antiquity down to the present time of children having been reared by animals, especially wolves. The earliest record of a wolf-child which he has discovered in northern Europe is that reported by William Dilich in 1341 as occurring in Hesse. Two Lithuanian cases of wolf-children were described by Connor in his "History of Poland," published in 1698, since when no cases have been described in Europe. Many recent cases, however, have been reported from India, mostly from the United Provinces, and also from Central India, as well as from Africa. Wolves are not the only animals which have been said to have carried off and suckled children. In classical antiquity, Atalanta is stated to have been suckled by a bear and Cyrus by a bitch, while in recent times bear-children, jaguar- and leopard-children have been recorded in India, and lion-children and a baboon-child in Africa. It is a remarkable fact that no stories of the kind have been reported from the New World, where examples of wolf- and bear-children might have been expected from North America and jaguar- and puma-children from South America. Although it has been suggested that wolf-children are idiots who have wandered into the jungle and taken up their abode in the dens of wolves, this hypothesis is by no means universally applicable, notably in the case of the jaguar-child in the North Cachar Hills, India. Dr. Hutton comes to the conclusion that the evidence from India of wolf- and leopard-children and from Africa of a baboon-child seems to support the hypothesis that the belief is founded on observed facts.—*Nature* 146:58 (July 13) 1940.

3. Rhodes, G. K.; Birnbaum, Walter, and Brown, M. J.: Acute Appendicitis: Clinical Review of One Thousand Consecutive Cases, *California & West. Med.* 45: 458 (Dec.) 1936.

TREATMENT OF APPENDICAL
PERITONITIS

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NEW ORLEANS

A critical review of 1,039 consecutive patients with acute appendicitis admitted to the Charity Hospital of Louisiana at New Orleans was undertaken in an endeavor to determine the most satisfactory method of treatment. In the entire group,¹ a large proportion of which came under our immediate care, there were fifty-six deaths, or a mortality rate of 5.3 per cent, a figure similar in magnitude to that obtained by others. A uniform request was sent to the record rooms of municipal hospitals in different parts of the United States. The results for a comparable period are shown in table 1.

In 860 (83 per cent) of the 1,039 cases the appendix was not ruptured at the time of entry. Prompt appendectomy was performed in every instance and was associated with seven deaths, or a mortality rate of 0.8 per cent. In one of the seven fatal cases the appendix was ruptured, with soiling of the peritoneal cavity during its removal. (In three other cases of acute appendicitis without perforation similar accidents occurred, without untoward sequelae.) Of the patients with appendicitis without perforation in this group, one in 123 died. Therapy of acute appendicitis without perforation will not be considered further.

One hundred and seventy-nine patients (17 per cent) had appendical peritonitis at the time of entry. Of this number forty-nine, or 27.3 per cent, died. One of every 3.6 patients with appendical peritonitis in this series died (chart 1).

Detailed analysis of these figures by age groups shows that the incidence of perforation with acute appendicitis is highest in childhood and in old age, although the incidence of the disease itself is highest in adolescence and early adult life, with 70 per cent of the patients between 10 and 30 years of age.

A reverse relationship obtains between the incidence and the case fatality rate; i. e., where the incidence is high, the mortality is low. In other words, the relationship between the percentage of patients with appendical peritonitis and the mortality in the various age groups is close, and the high mortality in the extremes of life is, in this series of patients, at least, more closely related to the high incidence of appendical peritonitis in that age group than to any other factor. The mortality rate of acute appendicitis without perforation in the various age groups is nearly the same, as is indeed that for patients with appendical peritonitis except in the group over 60 years of age, in which the mortality rate (table 2) rises sharply (eighteen patients and nine deaths).

Of the patients with acute appendicitis who died, 88 per cent had appendical peritonitis at the time of entry to the hospital. Of the total group, 17 per cent had appendical peritonitis at the time of entry.

In short, the problem of acute appendicitis in reality is the problem of prevention and treatment of appen-

dical peritonitis. By far the safest and surest measure to prevent appendical peritonitis is prompt removal of the acutely inflamed appendix before perforation has occurred. In our opinion there is no conservative treatment of acute appendicitis without perforation.

In this series, as elsewhere, the most important factor in the production of appendical peritonitis and death in the patient with acute appendicitis has been delay in instituting treatment. Seventy-four per cent of the patients with appendical peritonitis and 54 per cent of the patients who died waited more than two days after the onset of their symptoms before coming to the hospital. Although exact information is not available in this group of patients to determine the effect of catharsis on the incidence of appendical perforation and the mortality, our experience has been similar to that of Haggard,² Bower³ and others.

Of the 179 patients with appendical peritonitis, four died within so short a time that after admission to the hospital (less than twelve hours) that they will not be considered in the analysis except in computation of the mortality rate. All four were in shock at the time of entry. Three were not operated on. The fourth patient was unconscious and it was thought that she might have had a ruptured ectopic pregnancy. This patient died shortly after laparotomy, which showed generalized peritonitis of appendical origin. Three female patients who had generalized abdominal pain and tenderness associated with extremely rapid sedimentation rates were treated for pelvic inflammatory dis-

TABLE 1.—Patients with Acute Appendicitis

Location of Municipal Hospital	Period	Number	Deaths	Mortality, per Cent
West coast.....	1938	1,419	61	4.4
South central.....	1938	145	10	6.8
Middle west.....	1938	211	13	6.1
South (Charity Hospital)....	1937-1938	1,039	56	5.3

TABLE 2.—Mortality Statistics

Age	Mortality per Cent for Entire Group	Per Cent With Perforation	Mortality per Cent With Perforation	Mortality per Cent Without Perforation
0-4	18	73	25	0
5-9	7	25.3	27	0
10-19	3.6	14.6	25	0
20-29	3.2	12	15.6	1.5
30-39	7.6	16	36.8	2
40-49	5.5	24	23	0
50-59	6	27	22	0
60 plus	50	77.2	60	0

ease in the gynecologic service by hot douches, nourishing diet and enemas for distention. Although autopsy showed each of them to have appendical peritonitis, their cases teach little about treatment and will not be considered further except in computing the mortality rate. A girl aged 4 years was treated in the medical ward for gastro-enteritis for four days. Autopsy showed generalized peritonitis of appendical origin. A woman of 67 was treated in the medical ward with the diagnosis of cholecystitis. Autopsy revealed appendical peritonitis. A third patient, in the urologic service, was examined for a perinephric abscess. The patient died a few days after the removal of the perforated appendix through the exploratory lumbar incision.

From the surgical Services of the Charity Hospital of Louisiana at New Orleans and the Lexington Clinic.

Read before the Section on Surgery, General and Abdominal, at the Ninety-First Annual Session of the American Medical Association, June 12, 1940.

1. Ochsner, Alton: Postoperative Treatment, *South. M. J.* 29: 53 (Jan.) 1936.

2. Haggard, W. D.: Appendicitis: Analysis of 3,344 Cases, with Remarks on Delayed Operation in Delayed Appendicitis, *Am. J. Surg.* 28: 71 (April) 1935.

3. Bower, J. O.: Report of State Society Committee on Appendicitis Mortality, *Pennsylvania M. J.* 38: 257 (Jan.) 1935.

Indeed, incorrect diagnosis in cases of appendical peritonitis has been associated with the gravest prognosis. This was particularly true when enemas or catharsis had been used to relieve distention. A satisfactory prognosis cannot be expected without correct diagnosis and correct treatment. Except for determining the gross mortality rate in a statistical analysis, inclusion of such patients to determine proper methods of treat-

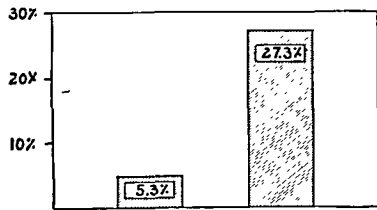


Chart 1.—Mortality of acute appendicitis. The column at the left represents the mortality percentage for the entire group, the column at the right for the group with appendical peritonitis.

ment would, in our opinion, confuse rather than clarify the results. Of the 169 patients with appendical peritonitis remaining, appendectomy was performed on ninety-four (55.9 per cent) as a primary procedure. Of these, thirty died, a mortality rate of 32 per cent. Seventy-five were treated by conservative methods (which included exploratory laparotomy without appendectomy and incision of residual abscesses as indicated), with nine deaths, or an indicated mortality rate of 12.6 per cent. Of fifteen patients with appendical peritonitis entering the hospital within twenty-four hours after the onset of their symptoms, twelve were treated by prompt appendectomy with two deaths; three were treated by conservative measures with two deaths (chart 2). Of ninety-two patients with appendical peritonitis entering the hospital from twenty-four to seventy-two hours after the onset of their symptoms, sixty-one were treated by immediate operation with fifteen deaths. Thirty-one were treated conservatively with five deaths (chart 3). Of sixty-two patients with appendical peritonitis whose symptoms were of more than three days' duration at the time of entry to the hospital, forty-one were subjected to immediate appendectomy, with three deaths; twenty-one were treated by prompt appendectomy with ten deaths (chart 4). We believe, however, that such figures fail to express accurately the entire situation, for we are convinced that operative intervention is the treatment of choice for certain patients with suspected appendical peritonitis.

In the first place, when the diagnosis of appendical peritonitis cannot be established with reasonable certainty, we agree with Gray and MacKenzie⁴ and others⁵ that, by and large, less harm is done by incision through the abdominal wall of the patient with appendical peritonitis than by omission of exploratory laparotomy in the presence of intestinal obstruction or a small, slowly leaking, perforated peptic ulcer.

We have also long been convinced that even if the abdominal wall is open it is wiser not to remove the appendix in cases of appendical peritonitis if adhesions must be broken down in its removal. This is particularly true, in our opinion, if the process is well walled off. During exploratory laparotomy in such cases appendectomy is done only if the appendix lies immediately beneath the incision and is not adherent to surrounding structures or there is a gross perforation at the base of the appendix through which intestinal contents continue to leak. With appendical peritonitis,

as with other conditions, the ultimate outcome depends on the outcome of the conflict between the patient's infection and his defensive powers to overcome it. In our opinion, when exploratory laparotomy reveals an open perforation through which fecal material continues to discharge, appendectomy aids the defense of the body by preventing further peritoneal soiling, but when the perforation and the appendix have been sealed off by omentum and surrounding intestine removal of the appendix, by breaking down the already established defensive measures of the body, may do more harm than good.

Again, if there is any doubt about perforation we advise exploratory laparotomy, for we feel that the damage done by exploratory laparotomy, with or without appendectomy, to the patient with appendical peritonitis is far less than that incurred by allowing an unruptured appendix to go on to perforation. The majority of patients with generalized peritonitis of appendical origin exhibit generalized abdominal pain and tenderness, absence of peristalsis on auscultation of the abdomen, rebound tenderness referred to the point of palpation of the left side of the abdomen, tenderness on both sides on rectal or vaginal examination and distention. (Of these, absence of peristalsis and abdominal distention are, in our experience, the most reliable.) In some patients with appendical peritonitis, however, particularly after localization has begun, one or more of these may be absent and the diagnosis of appendical peritonitis may be extremely difficult to make except by exploratory laparotomy. The converse may occasionally be true, for a patient whose appendix has not ruptured may present signs and symptoms suggestive of appendical peritonitis. This has been observed particularly of patients entering the hospital within twenty-four hours after the onset of their disease, and we have come to feel that the patient with acute appendicitis who enters the hospital within twenty-four hours of the onset is better treated by exploratory laparotomy and, almost without exception, removal of the appendix, regardless of the presence or absence of the clinical signs of perforation and generalized peritonitis. Perforation of the acutely inflamed appendix of a patient entering the hospital within twenty-four hours of the onset of the disease was found in only 4 per cent of the patients seen.

In those rare patients with acute appendicitis in whom distention and generalized abdominal tenderness develop within twenty-four hours, the symptoms in our experience have been due more frequently to peritoneal exudate and vigorous catharsis

than to gross perforation of the appendix. Another reason for urging appendectomy for these patients is the fact that if the appendix becomes ruptured within twenty-four hours the peritoneal cavity has had little time to prepare for such gross contamination and is poorly prepared to localize the infection. Operation in these circumstances usually shows an open per-

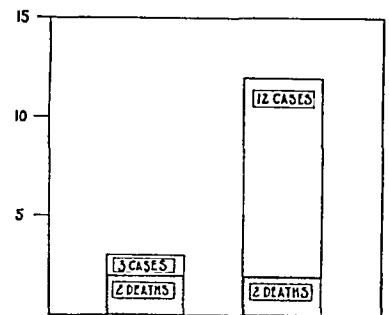


Chart 2.—Data on patients with appendical peritonitis seen within twenty-four hours of the onset. The column at the left represents those given conservative treatment, the column at the right those treated by immediate operation.

4. Gray, H. K., and MacKenzie, W. C.: Acute Appendicitis: Analysis of Results of Both Operative and Nonoperative Treatment in 674 Consecutive Cases, *S. Clin. North America* 17: 971 (Aug.) 1937.

5. Priestley, J. T., and McCormack, C. J.: Generalized Peritonitis Secondary to Rupture of Appendix, with Special Reference to Serum Therapy, *Surg., Gynec. & Obst.* 63: 675 (Nov.) 1936.

foration which continues to discharge fecal material into the abdominal cavity, in contradistinction to those occurring from seventy-two to ninety-six hours after the onset of symptoms, which are usually largely sealed by omentum or surrounding intestine. Among the small group of fifteen patients who had

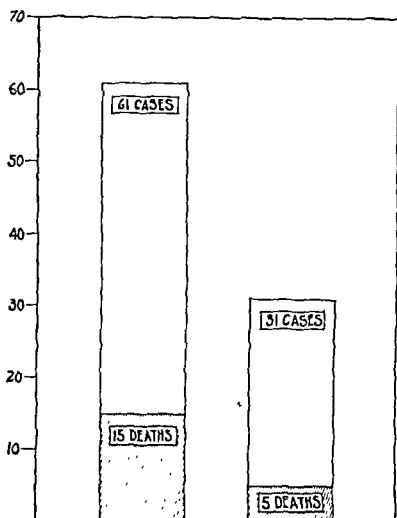


Chart 3.—Data on patients with appendical peritonitis seen within periods varying from twenty-four to seventy-two hours after the onset. The column at the left represents those treated by immediate operation, the column at the right those treated conservatively.

in six died when treated conservatively (chart 3). Such a statement of mortality, however, may be misleading, because for patients seen within four hours of the time of perforation, when the exact time of perforation can be established, appendectomy may well be the procedure of choice. Performed on patients with very recent perforation, in our experience, appendectomy has usually been followed by recovery.

Of sixty-two patients with appendical peritonitis whose symptoms were of more than three days' duration at the time of entry to the hospital, forty-one were treated conservatively with three deaths (one in fourteen). Twenty-one patients (chart 4) were subjected to prompt appendectomy with ten deaths (one in two).

We agree with Bancroft⁶ that it is a grave error to believe that just because a patient is not operated on he is being treated conservatively. Certain definite procedures based on the disturbance of physiologic function, which constantly occurs in patients with this disease,³ must be carried out if best results are to be expected. Although these measures have been detailed time and again¹ they will be briefly outlined here. The patient must be kept quietly in bed, so that localizing processes are minimally disturbed, a task which may be difficult with children. Too vigorous manipulation or examination may be disastrous. Elevation of the head of the bed will favor localization of secondary abscesses, if any, in the pelvis, where they can be detected and drained easily, rather than in the subphrenic space, where detection and treatment are more difficult.¹ Absolutely nothing by mouth should be given, in order to put the gastrointestinal system at complete functional rest. Distention is minimized by inhalation of concentrated oxygen⁷ and constant gastric suction of

acute appendicitis and perforation occurring within twenty-four hours of the onset of their disease, twelve were treated by prompt appendectomy, with two deaths; one of those who died was a boy aged 9 years and the other a woman of 73. Of three patients treated conservatively, two died (chart 2).

Of the patients entering the hospital between twenty-four and seventy-two hours after the onset of their disease, one in four died when treated by operation; one

the type advocated by Wangenstein. Of even greater value in decompressing the small bowel¹ is the double tube suggested by Miller and Abbott. The adynamic ileus accompanying the peritoneal infection can be combated satisfactorily by its use together with continuous suction. Intra gastric suction is also used to prevent the accumulation of fluid in a poorly functioning gastrointestinal tract. For the same reasons no food, solid or liquid, is allowed by mouth until gastrointestinal function has become reestablished as evidenced by detection of peristaltic sounds on auscultation of the abdomen. Morphine sulfate at regular intervals, usually one-sixth grain (0.01 Gm.) every three hours, unless the respirations are fewer than 14 per minute, both by its tonic action on the intestine⁸ and by its sedative action on the patient, has been found helpful. The fluid and salt balance of the patient is maintained by intravenous infusions twice daily. The administration of adrenal cortex extract is of inestimable value in combating the toxemia and aiding in maintenance of electrolyte balance. If nutrition by mouth must be withheld for a protracted period, multiple small transfusions help to combat anemia and hypoproteinemia. Sulfanilamide as an 0.8 per cent subcutaneous infusion was not used for these patients, but recently we have come to believe it to be of value in the treatment of appendical peritonitis.

An equally important part of the conservative treatment of appendical peritonitis is constant search for and appropriate treatment of secondary intraperitoneal abscesses. (Pylephlebitis and intrahepatic abscess will not be considered.) These will be considered in the inverse order of frequency.

The least frequent secondary intraperitoneal abscess is found in the subphrenic space. It may follow the original infection quickly or only after a prolonged interval. It is probable that infection in the subphrenic space without abscess formation is not infrequent and that it subsides spontaneously. There was one patient in this series of 1,039 who had a subphrenic abscess necessitating drainage. This patient recovered after a prolonged stay in the hospital. In two cases abscesses of the subphrenic space were found at autopsy.

Abscesses between the liver and the transverse colon are difficult to detect. In addition to the constitutional symptoms of continued sepsis, a mass in this region may be palpable. Incision is sometimes necessary; a short oblique subcostal incision is sufficient, but it is our impression that the great majority of subhepatic abscesses will subside spontaneously.

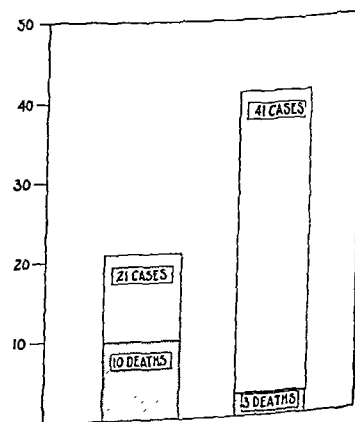


Chart 4.—Data on patients with appendical peritonitis seen more than seventy-two hours after the onset. The column at the right represents those treated conservatively, the column at the left those treated by immediate operation.

the type advocated by Wangenstein. Of even greater value in decompressing the small bowel¹ is the double tube suggested by Miller and Abbott. The adynamic ileus accompanying the peritoneal infection can be combated satisfactorily by its use together with continuous suction. Intra gastric suction is also used to prevent the accumulation of fluid in a poorly functioning gastrointestinal tract. For the same reasons no food, solid or liquid, is allowed by mouth until gastrointestinal function has become reestablished as evidenced by detection of peristaltic sounds on auscultation of the abdomen. Morphine sulfate at regular intervals, usually one-sixth grain (0.01 Gm.) every three hours, unless the respirations are fewer than 14 per minute, both by its tonic action on the intestine⁸ and by its sedative action on the patient, has been found helpful. The fluid and salt balance of the patient is maintained by intravenous infusions twice daily. The administration of adrenal cortex extract is of inestimable value in combating the toxemia and aiding in maintenance of electrolyte balance. If nutrition by mouth must be withheld for a protracted period, multiple small transfusions help to combat anemia and hypoproteinemia. Sulfanilamide as an 0.8 per cent subcutaneous infusion was not used for these patients, but recently we have come to believe it to be of value in the treatment of appendical peritonitis.

6. Bancroft, F. W.: Mortality in Acute Appendicitis, *Ann. Surg.* 105:56 (Jan.) 1937.

7. Fine, Jacob; Hermanson, A. L., and Frehling, Stanley: Further Clinical Experiences with 95 Per Cent O₂ for the Absorption of Air from the Body Tissues, *Ann. Surg.* 107:1 (Jan.) 1938. Haggard.²

8. Yonkman, F. F.; Hiebert, J. M., and Singh, Harkishen: Morphine and Intestinal Activity, *New England J. Med.* 214:507 (March 12) 1936. Ochsner, Alton; Gage, I. M., and Cutting, R. A.: Effect of Morphine on the Obstructed Intestine, *Arch. Surg.* 28:406 (Feb.) 1934.

Secondary abscesses in the left iliac fossa, as has been pointed out by one of us, are seen only in those patients with a shallow cul-de-sac, particularly children. Drainage through the left side of the abdominal wall is rarely necessary, for drainage of the associated cul-de-sac infection is usually sufficient for both.

Secondary infection in the cul-de-sac is, in our opinion, an almost constant companion to generalized peritonitis of appendical origin. Not a few such instances go on to abscess formation, but in many patients the induration and pain felt on rectal examination will subside spontaneously. Besides the constitutional signs and symptoms of continued sepsis, the patient with an abscess of the cul-de-sac has a loss of tone of the rectal sphincter as well as a boggy, fluctuant mass palpable on rectal examination. In the male patient, retention of urine may be the first symptom of an abscess of the cul-de-sac. Drainage through the rectum preceded by catheterization of the bladder and aspiration of the abscess has been satisfactory. An abscess in the right iliac fossa can be almost always palpated. In some instances such an abscess may attain tremendous size and yet give the patient no discomfort, either local or constitutional. In other instances a relatively small abscess in the right iliac fossa may be associated with severe systemic toxemia and demand drainage. Our experience has been similar to that of Lehman and Parker,⁹ who advise delay in operation until intervention is forced by a rising pulse and increasing fever, not only because the majority of such abscesses will resolve spontaneously but because a rather large mass in this region may be composed of indurated and inflamed mesentery and omentum and adherent loops of bowel with but little purulent material. When drainage has been necessary the McBurney incision and the extraperitoneal approach have been used.

SUMMARY AND CONCLUSIONS

In 860 of a series of 1,039 patients with acute appendicitis the disease was confined to the appendix; in 179 it had extended to the general peritoneal cavity.

The mortality among patients in whom the disease was confined to the appendix was 0.8 per cent; among those with appendical peritonitis it was 27.3 per cent.

Of fifteen patients with appendical peritonitis seen within twenty-four hours of the onset of symptoms, twelve were treated by prompt appendectomy with three deaths, and three by conservative measures with two deaths.

Of ninety-two patients with appendical peritonitis who entered the hospital from twenty-four to seventy-two hours after the onset of symptoms, sixty-one were treated by immediate operation with fifteen deaths; thirty-one were treated conservatively with five deaths.

Of sixty-two patients with appendical peritonitis with symptoms of more than three days' duration, twenty-one were subjected to immediate appendectomy with ten deaths and forty-one were treated conservatively with three deaths.

We feel that exploratory laparotomy is a wiser procedure than conservative measures in cases in which the diagnosis of acute appendicitis cannot be established with reasonable certainty or there is any doubt about perforation of the inflamed appendix and also for those seen within twenty-four hours of the onset of symptoms, although these factors are not subject to statistical proof on the basis of the material at hand.

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ABSTRACT OF DISCUSSION

ON PAPERS OF DRs. MILLER, FELL, BROCK AND TODD,
DRs. STAFFORD AND SPRONG AND DRs. BARROW
AND OCHSNER

DR. ALTON OCHSNER, New Orleans: The perennial question of the treatment of appendicitis has come up. There is this controversy concerning the treatment of appendical peritonitis but there is no controversy concerning the treatment of appendicitis per se. Even most ardent advocates of the conservative treatment of appendical peritonitis have emphasized the importance of immediate operation in uncomplicated appendicitis. Fortunately this morning no one has used the term "conservative treatment of appendicitis." The conservative treatment is limited to the treatment of appendical peritonitis. The statistics of Drs. Stafford and Sprong certainly are splendid, and one cannot deny the good results that they obtained. In Louisiana we feel that we have a somewhat different problem possibly from that which they have in Baltimore. Many of our patients come long distances from the bayous in southwestern Louisiana and practically all have had catharsis. Rupture is therefore usually present. The conservative treatment of appendical peritonitis is extremely difficult and the man who does occasional surgery will do far better by operating on these patients immediately irrespective of the time they are seen. We are convinced too that if there is any question about the advisability of operation or any question about the localization of the process the patient should be operated on. It is far better to operate on the patient unnecessarily and leave the abscess alone, back out, although it takes a great deal of courage to do it, than to overlook the possibility of a spreading infection. We are convinced that there are patients with a localizing disease, not a spreading peritonitis (every patient with a spreading peritonitis, unless moribund, should be operated on), who are better treated conservatively than operated on immediately. The difficulty is in the diagnosis. There is nothing that requires more surgical skill and judgment in distinguishing between these two groups of cases. If there is a definite localization as compared with a generalized tenderness, we believe that the case should be treated conservatively. These patients require a great deal more care subsequently. The incidence of intraperitoneal abscess is greater. Dr. Barrow has emphasized the importance of looking for these abscesses in particular locations. They are not difficult to diagnose if one will think of their possible occurrence. These patients should have rectal examinations done every other day at least, and many of the infections will subside spontaneously; but once the abscess has developed, it must be drained.

DR. E. H. FELL, Chicago: It has been of interest to note how much the papers have been similar in thought. However, Dr. Miller and his associates felt very definitely that all appendical abscesses should be treated conservatively and in that group which was treated conservatively only 2.5 per cent mortality occurred. I differ with Drs. Stafford and Sprong, and in their group which were operated on they had a mortality of 7 per cent. All patients with spreading peritonitis should be operated on and, I believe, should receive a very careful preoperative preparation. I do not take them from the examining room up to the operating room; their fluids should be balanced and blood given when needed. These important parts of the treatment of peritonitis are the preoperative and postoperative maintenance of fluids, proteins and electrolytic balances. In amplification of what Dr. Miller and his co-workers have said, I wish to call attention to four points: 1. Occasionally a definite palpable acutely tender mass may be present in the right lower quadrant during the early hours of an attack before a perforation has occurred, which is due to the omentum wrapping itself about the acutely inflamed appendix. Under these circumstances it would be unwise to follow the general rule as to conservation, and I believe that immediate operation is definitely indicated. 2. At times the clinical picture of an appendical abscess may be closely simulated by something which demands immediate surgery. I refer particularly to an atypical intussusception which has been present for some time. 3. Not every case of spreading or general peri-

9. Lehman, E. C., and Parker, W. H.: The Treatment of Intraperitoneal Abscess Arising from Appendicitis, *Ann. Surg.* 108: 833 (Nov.) 1938.

tonitis which apparently is due to a ruptured appendix is necessarily of appendical origin and therefore surgical intervention may occasionally be carried out when a conservative course would have been the wise policy. I refer to hematogenous peritonitis. 4. The patients in group 2 who have returned for appendectomy during the quiet interval, that is three months after the disappearance of a palpable mass, have shown at operation a variable pathologic type. Most times there have been a few adhesions between the appendix and the adjacent structures. Occasionally the appendix is embedded in a dense mass of adhesions and is difficult to remove. At times a small sterile abscess remains. The point I wish to make is this: In my experience, no matter how extensive is the pathologic condition, the operation can be carried out safely at this time without a mortality.

DR. HARVEY B. STONE, Baltimore: There has come to my attention, as one who frequently has to examine young surgeons for the American Board of Surgery, a keen recognition of the chaotic state of opinion as regards the handling of certain phases of appendicitis and its complications. Dr. Ochsner in his discussion has done well to point out that the controversy does not concern the handling of appendicitis *per se*, that there is no division of opinion as to the method in which simple acute appendicitis should be handled; we are all agreed that the only safe way to deal with that condition is by immediate operation. The variations in points of view arise when further complications of the original appendicitis have taken place, and particularly in those two groups of cases in which abscess has formed or in which a spreading peritonitis of varying degrees of intensity has developed. Perhaps the best discussion that one can make is to give his own point of view. I would agree with the paper of Dr. Miller and his co-workers almost in toto except for one point. They say that appendix abscess should not be operated on. If they would modify that by saying that appendicitis with abscess formation need not necessarily be operated on immediately, I would be willing to agree. I cannot feel that full obligation has been carried out to the patient in permitting him to go home without some certain knowledge that he will return or, better still, removal of his affected appendix before he is permitted to leave the hospital. The qualifications that Dr. Ochsner has placed about his advocacy of deferred surgical treatment of certain forms of acute appendicitis are very necessary, but it does not remove the basic objection to that form of treatment. He is careful to say that the postponement of operation is only a part of the treatment, that the rehabilitative measures which accompany the delay are fully as important a part of the treatment. I would like to submit the question as to whether the advantage which the patient obtains under this method of treatment is not due entirely to the rehabilitative measures and not to the delay. I cannot believe that this great concern to avoid intervention with a diseased appendix is justified in view of his apparent willingness to leave such a diseased appendix continuing in the abdomen. It seems to me that the basic principle of treatment of advanced disease of the appendix is the removal of the diseased organ and that the employment of the rehabilitative measures is important accessory treatment but does not get to the base of the trouble.

DR. JOHN S. HORSLEY JR., Richmond, Va.: I particularly want to endorse what Drs. Stafford and Sprong said and what Dr. Harvey Stone emphasized in his discussion. Of the appendectomies done as the main procedure at our hospital in Richmond, Va., from Jan. 1, 1931, to June 1, 1940, there were 706 cases of acute appendicitis with five deaths and none of those were due to peritonitis, a mortality of 0.71 per cent. There were 133 cases of acute appendicitis with peritonitis with three deaths, a mortality of 2.26 per cent. There were 258 cases of subacute and chronic appendicitis with no deaths. There was one case of carcinoma of the appendix. A total of 1,098 consecutive cases were done mainly for appendicitis with eight deaths, only one of which was due to peritonitis, and that was an abscess case, a total mortality of 0.7 per cent. With regard to acute appendicitis, ruptured and unruptured, there were 706 cases of the acute form with five deaths, 0.7 per cent mortality.

There were ninety-one cases of acute perforated appendicitis classified as abscessed and localized peritonitis with one death, and that was due to a spreading peritonitis, a mortality of 1.1 per cent. There were forty-two cases of generalized spreading peritonitis with two deaths, a mortality of 4.7 per cent. In the spreading peritonitis group the first patient had 2 feet of gangrenous bowel at the time of operation which needed resection, and the second patient in this group died four weeks after operation from pulmonary embolism. These operations have been done by three operators, three Horsleys, father and two sons, in one hospital and have been followed carefully and accurately. Based on these statistics we have come to a five point program which summarizes our ideas about the treatment of acute appendicitis, both ruptured and unruptured: 1. Immediate operation as soon as the diagnosis is made, no matter what the stage of the disease, whether abscess, general peritonitis or unruptured. 2. A small McBurney incision, with gentle handling of the tissues, and always removal of the appendix. In this group of 1,098 cases the appendix was removed in every instance at the original operation. 3. Use of suction apparatus instead of sponging to remove any fluid in those that have had a perforation. 4. Physiologic rest of the affected colon by avoiding proctoclysis and giving intravenously dextrose in Ringer's solution, using a Jutte or Abbott tube for decompression of the stomach and using a minimum of drainage. We have been using fewer and fewer drains until in the more recent months we have been closing many of the abdomens in cases of perforation without drainage except for the abdominal wall. 5. Simple treatment of the stump of the appendix, merely ligating the stump and bringing over a tag of peritoneum-covered fat to protect the stump from the drainage tube and any complicating adhesions.

DR. JOHN J. GILBRIDE, Philadelphia: It has been shown here that many conditions add to the mortality rate in acute appendicitis. An appendix that occupies an unusual position makes it very difficult sometimes to arrive at a correct diagnosis. In each of three cases in which the appendix was adherent to the urinary bladder the symptoms were largely those of vesical tenesmus, pain in the urinary bladder associated with pain and tenderness in the right lower quadrant. Pain and tenderness in the right lower quadrant led me to make a tentative diagnosis that the condition was one of appendicitis. Cystoscopic examination by skilled cystoscopists in each instance showed an area of hyperemia in the posterior superior wall of the bladder. The size of that area varied from 0.5 to 1 cm. The appendix was removed at operation and it was found to be adherent to the urinary bladder. It had not perforated into the bladder.

DR. EDWIN M. MILLER, Chicago: The greatest thing in surgery, as I see it, is surgical judgment. I would hesitate to question the surgical judgment of men like Dr. Harvey Stone, Dr. Ochsner, Dr. Stafford or Dr. Horsley but with some of the statements they have made we cannot agree. We wish to emphasize strongly that for patients in what we call group 2 with evidence of perforation, against which there has been established an adequate defense as demonstrable clinically by palpation of a definite local appendical mass (I don't say abscess) we believe that the conservative policy is by far the safest procedure, because we have plenty of evidence to show that in over 90 per cent of such patients careful observation, day after day, will show that the appendical mass will spontaneously subside and completely disappear; that only a few patients, less than 5 per cent in that group, will develop what is unquestionably a definite abscess that demands surgical drainage. I cannot agree with Dr. Horsley in his position when he says that not only should all such patients (*i. e.*, those with an appendical mass) be operated on but that the appendix must always be removed. In my opinion such a procedure is dangerous. Many times the pathologic condition is localized to the tip of the appendix, around which the abscess has developed. Two thirds or more of that appendix may lie entirely outside the walls of that localized mass, and to attempt to remove that appendix at the time of the acute process is only courting trouble.

HEALTH INFORMATION, PLEASE

HOMER N. CALVER

Secretary, American Museum of Health, Inc.

NEW YORK

A few weeks ago Amos and Andy were discussing the medical examination which Amos had just taken. They were agreed that a "catabolism" test did one a lot of good but were uncertain what it cured.

Few of us who are engaged in medicine or public health realize how meaningless to others are the words we constantly use and how incomprehensible are the processes of thought which we habitually follow. The bewilderment of the financier over a medical report, however, is similar to our bewilderment in a maze of figures. For instance, the following excerpt from a report to the stockholders of the ABC Company gives little reward for our efforts to decipher it from the small type in which it is printed:

To provide for the accounting adjustments above described all the corporate surpluses, both earned and capital, of ABC Company as of January 1, 1939, in the amount of approximately \$75,500,000, and the then existing reserve against certain investments, amounting to approximately \$6,500,000, will first be used, and then the new additional capital surplus created by the reduction in the stated value of the common stock, amounting approximately to \$134,700,000, will be utilized to the extent necessary.

Considerable knowledge of accounting practice is needed to elicit information from this sentence, even after careful study. It illustrates how wide the gulf is between the specialist and the layman. Further illustrations appear in Tonics and Sedatives every week.

The medical profession itself has been a principal contributor to this popular ignorance of medical matters. Unconsciously it has for the most part and until lately been bound by the tradition of the "medicine man," who practiced his mysteries to impress his tribe. I stress the word unconsciously because this picture of esoteric aloofness is not compatible with the concept of the true physician. Every doctor has been repeatedly reminded that his title means "teacher." Yet as far as I know medical schools never give him any training in how to teach. He is like an artilleryman with a magnificent supply of ammunition who has never been shown how to load, aim and fire a cannon. In his efforts to acquire these technics for himself it is not surprising if he is sometimes injured in a backfire.

This reluctance of the medical profession to take the public into its confidence has had at least three adverse effects on the profession itself. First, just as weeds will grow where crops are not planted, it has left the field open for the quack and the charlatan. To the layman without medical knowledge the jargon of the pseudoscientist is indistinguishable from the learned discourse of the physician. "Catabolism" sounds just as impressive as metabolism. The doctor must learn to talk in terms the public cannot misunderstand or else teach the public to understand the terms he uses.

Second, a man who does not understand the necessity for medical service or who is not aware of the resources which medical science offers is not likely to seek medical care even when he can afford to pay for it. Other public

services based on science have met this problem with benefit to themselves. The telephone company does not talk to the public in terms of dynes and ohms. It says "Speak directly into the mouthpiece." "Hold the receiver close to the ear." "Answer the telephone promptly." With the dial telephone, it has even taught us to be switchboard operators. Increased familiarity with this utility promotes increased use. The same has been true of the automobile, the radio and the electric light. It can be true for medical service also. Many a physician already will tell you he has had increased demands for diphtheria immunizations after a public campaign for diphtheria prevention. Such results can be extended to cover the whole field of medical practice.

A third adversity which the profession must now face, partly as the result of its own negligence, is a flood of propaganda for new systems of medical care. Though better and more widespread health education may not have prevented this social development, the proposals themselves would be based on a greater appreciation of the realities if the proponents always knew what they were talking about. It is perhaps significant that government efforts to regulate the telephone monopoly have not made much progress.

To a considerable extent a program of health education is a public relations program for the medical profession and its allied workers. In a democracy such programs to be effective must reach a large proportion of the whole mass of people. They must be as intense and as far reaching as the preparations of a dictator for war. Indeed, mass health education is a necessary step in the totalitarian war against disease, which it is high time we began. One wonders whether in the next draft the physical condition of our young men will prove to be any better than it was last time. The mobilization of a whole population for a total war against disease and preventable death is not a small task. It must have greater breadth and depth than is represented by the present trickle of pamphlets, lectures, radio talks and motion pictures, however excellent these may be individually. The situation calls for a better integration of effort, more well trained leaders, a better understanding and use of available technics and a large increase in financial support.

The museum of health is conceived to be an important instrument in this necessary program of preparedness and engagement. The program calls for not just one museum, such as the American Museum of Health which you can see in the initial and more obvious phases of its operation at the New York World's Fair, or such as the Cleveland Museum of Health and Hygiene, which will open its doors to the public this year, but for many museums spread throughout the country like a vast division of heavy tanks, each with its own board of directors, employees and funds, and a program devised to meet the dispositions of the enemy in its territory. In each locality the medical profession must take a leading part in the creations of such museums, as it has in New York and Cleveland.

The American Museum of Health in New York was the result of some ten years of planning. It is now in its second year of operation. Its sole activity thus far has been to prepare and present a popular exhibit on medicine and public health at the New York World's Fair. It has plans for a large number of other activities

in line with its objectives as an institutional headquarters for mass education in health. It has already collaborated and hopes to extend its collaboration with national and local professional, voluntary and official health and medical organizations and a number of other agencies. It has adhered to the principle that showmanship and science are of equal importance, and that failure will result if either is made subservient to the other.

THE VISITOR REACTION STUDY AND SUPPLEMENTAL INVESTIGATIONS

A serious and justifiable criticism of health exhibits as well as all health education activities is that the good they do is unknown. The health educator has not in general attempted to demonstrate that his work has saved lives, as the laboratory man has shown that his service has prevented disease. Results have been reported in terms of subjective opinion which were not supported with objective data. When the American Museum of Health embarked on its work, therefore, it at once set up plans for a study of its own operation and of the public who were its patrons.¹ This plan was organized as a "Visitor Reaction Study," which operated chiefly at the New York World's Fair. Similar supplemental studies are being carried on this year in both the New York and the San Francisco fairs.

The Visitor Reaction Study included a dozen or more test procedures devised by Dr. Mayhew Derryberry² and his associates and applied to more than 50,000 visitors. No one person was given all the tests, and no one test was given to everybody. In each case the test was used with a sufficiently large group so that the results would be statistically significant. Analysis of this enormous volume of data will not be complete until this fall. Some tentative observations can be made now, however, on the basis of some analyses completed or in progress. It is to be emphasized that these observations are necessarily tentative and subject to amendment when the study of the data is completed.

From the opening day, when 60,000 visitors were clocked in, it was obvious that the exhibit would be a major attraction. When the fair closed on a rainy Hallowe'en, the Medicine and Public Health Building had rolled up a total attendance of more than 7,500,000. Of this it is estimated that 5,542,000 visited the Hall of Man and 4,947,000 visited the Hall of Medical Science. An analysis of fifty-two exhibit units in the Hall of Man showed that the number of visitors who stopped to look at the four most popular exhibits were, in round figures, Transparent Man, 3,340,000; Embryo Panel, 2,302,000; First Year of Life, 2,161,000; Maze of Superstition, 2,115,000. Least popular were four panels representing the organs of smell, the mechanics of hearing, the organs of taste and the mechanics of vision. These exhibits had only from 123,000 to 189,000 apiece. The number of visitors to the twenty-five exhibits in the Hall of Medical Science showed that the most popular were Anesthesia, 1,143,000; Carrel-Lindbergh Culture of Organs, 1,397,000; Education of the Blind, 1,369,000; Cancer, 1,289,000. The least popular were Mental Hygiene, 439,000; Safeguarding Medical Products, 361,000; Social Hygiene, 351,000; Industrial Sanitation, 243,000.

Our studies, however, were not confined to a mere counting of visitors. The exhibits were rated according to choice by approximately 20,000 visitors, and these ratings are being compared with similar ratings by three hundred experts. Comments were solicited from time to time and a record was kept of *unsolicited* comments made to the attendants. Tests were made which indicated the general level of health information of the public, and these data are being analyzed with respect to age, sex and other factors. Experiments were undertaken to determine the reading difficulty of legends. In many instances it was extraordinarily difficult to write a legend which was scientifically satisfactory as well as popularly understandable.

In the course of the study an attempt was made to ascertain what subjects the public would like to see treated in exhibits. Six subjects which were not covered and about which there had been frequent inquiry were submitted to some 20,000 individuals with this question: "Would you be interested in seeing an exhibit on the following subjects? Please check." The number checking these six topics were: Birth Control, 54 per cent; Need for Periodic Health Examinations, 46 per cent; Hospital Insurance, 39 per cent; Abortion, 33 per cent; Compulsory Health Insurance, 29 per cent; Arthritis, 26 per cent.

As might be expected, the age of the visitor determined to a striking extent his interest. As age increased there was a marked increase in the percentage of persons interested in periodic health examinations and arthritis and a less marked but nevertheless appreciable increase in the percentage interested in hospital and compulsory health insurance. Excepting in the 21 to 30 age group, age is inversely correlated with the proportion of individuals interested in exhibits on birth control and abortion. There were also interesting sex differences. More females than males were interested in arthritis, and this disparity in interest increased with age. More males than females were interested in compulsory health insurance, and this difference in interest remained approximately constant as age increased. In the under 21 age group the percentage of females interested in birth control and abortion was significantly higher than the male, but this sex difference was not apparent in the older age groups. Since no data are available on the actual age distribution of visitors to the Medicine and Public Health Building, deductions should be made with caution from the total percentage figures.

At the same time, visitors were given an opportunity to suggest other subjects. The answers to approximately 1,600 suggestions have been grouped into ten categories. The category which had to do with diseases exceeded all others by two to one, but it will interest this group to know that the second largest category was that which included the various replies dealing with some aspect of medical training and organized medical service.

The question has been raised whether or not health exhibits contribute to hypochondria. An effort to answer this question was made through the Gallup poll technic. Trained interviewers asked 1,000 individuals "Has looking at these exhibits suggested to you that you might have some condition that needs correction?" Approximately 10 per cent replied in the affirmative. Some of them admitted that they were concerned about themselves before they saw the exhibits. Others indicated that they were sufficiently disturbed to consult

1. For this purpose the museum was fortunate in securing funds from the Carnegie Corporation of New York, the active collaboration of the U. S. Public Health Service, and material assistance from the New York World's Fair, the National Youth Administration, the Works Progress Administration and a large number of other organizations and individuals.

2. Senior Public Health Statistician, U. S. Public Health Service.

a physician—which might be classed as a desirable result. The final comparison of the data with the normal hypochondria rate—if there is such a thing—should prove interesting. In any event, no epidemic of hypochondriasis has since been reported.

With one exception no diagnostic procedures were included in the exhibits. This exception was the rapid chest x-ray survey conducted by the Queens County Medical Society. In this exhibit more than 11,000 paper roentgenograms were made. Readings of all these were done by specialists in this field designated by the county medical society. Negative results were reported directly to the patient with an appropriate word of caution, and positive readings were referred to the patient's family physician with a letter of explanation. Reports of the radiologists indicated that a little better than 3 per cent of the roentgenograms showed pulmonary tuberculosis which was probably active in the first, second or third stages.

One of the most important questions we set ourselves to answer was "What did the public learn from the exhibits?" Some 30,000 people were asked to fill out test blanks on each of which were twenty-five questions relating to health. Some of these questions were based on the exhibits and some were not. Some people answered the questions before they had seen the exhibits, and others answered them after they had seen the exhibits. Those who had seen an exhibit made significantly higher scores on the test questions relating to that exhibit than those who had not seen the exhibit, with the exception of one exhibit.

From the analysis of this material, we are accumulating a wealth of valuable corollary data and learning that some exhibit technics are ineffective. For instance, it would seem that certain types of statistical facts are not easily absorbed and may by their method of presentation give a wrong impression.

Some preliminary analyses indicate that the pneumonia exhibit failed to register the fact that rusty sputum is a symptom of pneumonia, and the cancer exhibit was not getting across the idea that surgery and x-rays were acceptable methods of treating cancer. In other words, we had abundant evidence that there were good ways and poor ways of telling our story. Things that seemed so clear to us in the words, pictures and charts were sometimes considerably less than clear to many people.

A report of the Visitor Reaction Study will be published this winter. Representing as it will a sampling of 7,500,000 people, it should be of enormous value to all who are engaged in health education or exhibit planning in any field.

Our experience already warrants several conclusions:

1. The people thirst for knowledge about themselves.
 2. It cannot be assumed that those who have this knowledge are able to give it to the public in a way it will understand. Study and elaboration of effective technics for imparting medical and health information through exhibits and otherwise are needed.
 3. It has been demonstrated that the museum of health is an effective instrument for mass education for health.
 4. It is a fair deduction from experience in other fields that increased popular knowledge of medical matters will result in increased use of medical service.
- The members of the American Medical Association have a great opportunity to benefit the public as well

as their profession if they will take the leadership in their communities in the development of museums of health which constantly test their health education programs objectively for results.

30 Rockefeller Plaza.

ABSTRACT OF DISCUSSION

DR. HARRISON S. MARTLAND, Newark, N. J.: I first met Mr. Calver at the time he was planning and organizing the New York World's Fair medical exhibits. While directing these public health exhibits he has had a unique opportunity to demonstrate the popularity, value and necessity of permanent public health museums for lay education. Further evidence of the popularity of lay medical exhibits has been demonstrated this year in Essex County, N. J. The president of the county medical society at the time, Dr. Royal A. Schaaf, felt that lay education was a most important function of a county society. He said "Why not have a Medical Week." We did that. There were over forty exhibits covering such subjects as cancer, pneumonia, fractures, first aid, endocrinology, vitamins, pediatrics, obstetrics, allergy, hygiene, serums and antitoxins, instruments of precision as employed in medicine, blood transfusions and operating room technic. The exhibit on the value of autopsies was most unusual. Letters from leading Catholic, Jewish and Protestant clergymen were prominently displayed. These letters indicated that there were no religious objections to the properly performed autopsy and were read with great interest by the public. Medical motion pictures of general interest were continuously shown and special lectures for the laity were given. The speakers were prominent physicians from other parts of the country. The exhibits were in charge of nurses, technicians or interns, and all publicity as far as personal medical advertising was concerned was prevented. During the week in a community of about 900,000 the exhibit, which had been widely advertised in the newspapers and stores, drew over 40,000 people. On one day alone 13,500 attended the exhibits, and at one of the evening lectures more than 1,500 had to be turned away. We feel that two main objectives were attained: First, to demonstrate to the community that the county society is also an educational institution and not a selfish economic body. Second, to gain the good will of the public for organized medicine. Of course in an exhibit of this type there are many pitfalls, and diplomacy is necessary. At the end of the exhibit, however, we felt that the attempt was well worth while and would accomplish more than the many other efforts to combat quackery, cultism and unworkable social changes in the patient-doctor relationship. There is a real necessity for adequate permanent public health exhibits, and these may by education solve many of the public relation problems now besetting the medical profession.

MR. HOMER N. CALVER, New York: Dr. Martland's report of what they did in Essex County suggests what other county medical societies can do in this direction. I should like to emphasize that the situation calls for more than sporadic or temporary effort, as illustrated in a one week or two week exhibit. Disease doesn't attack one week or two weeks at a time. It is with us always, and we see the museum of health, as distinguished from the temporary exhibit, as an institution which will continuously wage war against ill health as the exhibit does temporarily. I should like to express our profound gratitude to some 300 to 400 leaders in the medical profession whose time-consuming effort made possible this show we now have. They met, I assure you, often and long, and without their guidance this project could never have been launched.

Relaxation.—The benefits to be gained from frequent periods of relaxation are by no means fully appreciated by the majority of people. To lie down for a few minutes after lunch and relax, even though we do not actually lose consciousness, will drop the blood pressure and pulse rate, remove the feeling of being rushed or harassed, and fit the individual for his afternoon's work to an extent considerably out of proportion to the time expended for the purpose.—Smiley, Dean Franklin, and Gould, Adrian Gordon: *A College Textbook of Hygiene*, New York, Macmillan Company, 1940.

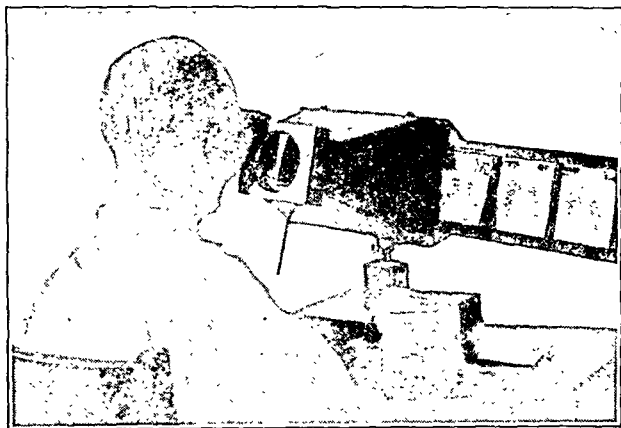
THE MINIATURE X-RAY FILM IN THE "TOTAL SURVEY"

FREDERICK TICE, M.D.

President, Board of Directors, Municipal Tuberculosis Sanitarium
CHICAGO

The necessity for a "total x-ray survey" in certain areas of high mortality in Chicago has long been realized. By total survey is meant survey, in the district selected, of every man, woman and child, reaching toward an ideal though probably unobtainable objective of 100 per cent. The reasons for such an effort were compelling. In Chicago the tuberculosis problem, largely enclosed in the Negro (281.7 per hundred thousand mortality against 34.0 per hundred thousand mortality in the white population) is, to a certain extent, geographically circumscribed. In 1939 six predominantly Negro census districts, with 17.5 per cent of the population, accounted for 47.8 per cent of the tuberculosis deaths.

An x-ray project of the magnitude indicated was far beyond our means in terms of the standard film and the project, necessarily, was held in abeyance. Finally,



View box for miniature x-ray films.

with the advent of x-ray photography, practically initiated by Manoel De Abreu of Rio de Janeiro, introduced in this country by Lindberg and Potter, came the answer to our problem. In the work being reported here the photoroentgenographic unit developed by one of the equipment houses in collaboration with Potter, reported elsewhere by Potter and Douglas, was used throughout. The size of the film is 4 by 5 inches and the approximate cost of each film is 5 cents. In the perfection of this photoroentgenographic unit the Municipal Tuberculosis Sanitarium demonstrated its interest and cooperation by referral of the tuberculous and non-tuberculous cases necessary for the experiment.

For purposes of the total survey, the photoroentgenographic apparatus was installed in a mobile x-ray unit, already in our possession. This unit consists of standard x-ray equipment, complete with dressing rooms, ventilators and fans, mounted on a balloon-tired 2½ ton truck and supplied with 200 feet of cable for connection with the power outlets.

PROCEDURE AND ORGANIZATION

X-ray examination within easy walking distance was a prime objective. The prospects would not walk long distances. Neither, as we knew from experience, would

they or could they use the street cars. Owing to economic conditions prevalent in the areas to be surveyed, the carfare, involving rides for all the members of the family, was in itself prohibitory. It resolved itself therefore into a question of the mountain and Mahomet.

Laying out the work in accordance with this idea, Census District 35 (highest mortality area in the city) was surveyed and stations were so selected that the patients living farthest away would have to walk only a few blocks. Many lived in the same block, around the corner or across the street. The response to our request for free space and facilities was encouraging. Such organizations as the Y. M. C. A., other municipal clinics, welfare organizations, factories, even a police station, were approached and offered cooperation. The location first chosen was the Negro Y. M. C. A., situated in the heart of this area of high mortality.

Preceding the actual work at the Y there was, of course, the usual publicity and educational build-up. Employed and exploited to the full were such mediums as the local newspapers, posters, trailers in the local movie houses, radio talks and brisk liaison with such organizations as the medical society, insurance companies, funeral aid societies, the churches, welfare groups and others.

Contemporaneous with the campaign of education and publicity, ten field nurses were assigned to make an intensive house to house canvass of the one-half square mile immediately surrounding the Y. These nurses further enhanced the publicity, established a building record and family count, furnished assignments for x-ray examination and prosecuted the follow-up. The truck, at the first assignment, was in operation seven days a week, including Sunday, from 1 to 9 p. m. Daily attendance ran from a low of 100 to a high of 300. The entire family was urged to report at the unit and repetitive nurses' visits supplemented with form letters continued the stimulus. Starting April 15, 1940, 10,000 patients had been filmed by June 20, and this report was organized to include data of patients examined to June 18.

X-RAY INTERPRETATION

To avoid individualistic trends, the films were read by a committee of four head physicians, all especially experienced in x-ray interpretation. Opinion had to be unanimous on every diagnosed case. If one member of the committee disagreed, the case was classed as "suspect" and a 14 by 17 film ordered. In addition, all films showing suspicious or abnormal markings were classed as suspects and similarly followed up.

With regard to the technic of film examination, the hand glass, used at first, was found to be tiring to the eyes and unsatisfactory. Owing to the fact that the development was new, no view box for the 4 by 5 films was available. Urged by necessity, the Superintendent of Clinics designed a box which has given excellent results. The apparatus, shown in the accompanying illustration, is a double cone shaped box 22 inches long with a 4 inch magnifying glass at the anterior apex. A runner 30 inches long, capable of holding six miniatures, is part of the equipment. This runner is loaded by an assistant and the films are passed rapidly across the illuminated opening in the face of the posterior cone. The magnified image is about 8 by 10, is easy on the eyes and shows a fine differentiation of detail. For the convenience of the committee, the arrangement is mounted on a swivel base so that the viewing apparatus can be quickly rotated to each examiner in turn.

FORMS AND STATISTICS

The statistical material covering the primary examination is compiled on both sides of the small manila envelop used to hold the miniatures. The front of the envelop contains the identifying data, the back the diagnosis, classification and other items. Several other forms are used, including the housing record to show the number of residents per house or flat, assignment blanks, a form letter of notification to all negative cases and a form letter for reference of nontuberculous conditions. All diagnosed and suspected cases are fully charted in the usual way and subjected to clinic supervision. All plates read as tuberculous are sent immediately to the extramural collapse clinic for study concerning the possibility of ambulant pneumothorax. As a side issue and as a phase of social service work, patients showing cardiac or nontuberculous pulmonary conditions are referred to the indicated clinics.

RESULTS

Of the 10,000 cases in which x-ray films were made to June 18, 1940, 9,348 were fully analyzed and charted. Of these cases 8,942 were of Negroes, 340 of white persons, thirty-four of Mexicans and thirty-two of others. Table 1 furnishes the breakdown according to race and sex.

The principal highlight in this tabulation centers on the 351 cases of "reinfection type" tuberculosis discovered. To these may be added the forty-five cases read as suspects on the original miniature and diagnosed as tuberculous in later films. The addition of the forty-five cases raises the percentage of roentgenologically demon-

x-ray examination of the large "suspect reinfection" group will increase the disease incidence above the figures given.

The disease incidence of 5.29 per cent in the 340 white persons examined, against the 3.71 per cent in the 8,942 Negroes examined, is interesting from the

TABLE 2.—Negro Cases: Analysis by Age and Sex

Ages	Total X-Ray Examinations			Reinfection Cases					
				Number			Per Cent		
	Male	Female	Total	Male	Female	Total	Male	Female	Average
14 years and under...	1,433	1,525	2,958	9	15	24	0.6	1.0	0.8
15 to 19 years.....	396	477	873	17	20	37	4.3	4.2	4.2
20 to 24 years.....	239	387	626	9	23	32	3.7	5.9	5.1
25 to 29 years.....	280	458	738	10	32	42	3.6	4.8	4.3
30 to 34 years.....	265	480	745	14	16	30	5.2	3.3	4.0
35 to 39 years.....	267	422	689	11	16	27	4.1	3.8	3.9
40 to 44 years.....	265	389	654	12	20	32	4.5	5.1	4.9
45 to 49 years.....	211	300	511	14	10	24	6.6	3.3	4.7
50 to 54 years.....	171	223	394	16	16	32	9.4	7.2	8.1
55 to 59 years.....	150	163	313	12	9	21	8.0	5.5	6.7
60 to 64 years.....	79	88	167	11	6	17	13.9	6.8	10.2
65 to 69 years.....	78	89	167	8	5	13	10.3	5.6	7.5
70 to 74 years.....	43	26	69	7	1	8	16.3	3.8	11.6
75 years and over....	16	8	24	0	1	1	...	12.5	4.2
Children unknown....	3	1	4	0	0	0	...	...	...
Adults unknown.....	5	5	10	0	1	1	...	20.0	10.0
Total Negro.....	3,901	5,041	8,942	150	181	331	3.8	3.6	3.7

fact that the rates run counter to the usual concept. To all intents and purposes the white persons examined in the present survey live under the same sociologic, environmental and economic conditions as the Negroes. Are the rates, as quoted, merely accidental or do they adumbrate an actuality? The number of white persons in the 10,000 x-ray examinations is too small to justify any basis for conclusions. In the course of a year, with seventy or a hundred thousand total x-ray examinations, including possibly four or five thousand white persons, the figures in final analysis should throw some light on a highly debatable question, the relative disease incidence between Negroes and white persons in similar economic brackets.

WHITE RACE

Owing to limitations of space and paucity of material, the analytic tabulation for the 340 white persons is not submitted. One fact needs to be mentioned concerning the white persons in the fifteen years and over period: a total rate, "reinfection type," for both sexes of 6.8 per cent, 9.5 per cent for the males, 4.5 per cent for the females. The figure, particularly for the males, is high. Further investigation will doubtless reveal that many of these cases have been contacts to open tuberculosis and such an investigation also will show that the families live under extremely poor environmental conditions.

NEGRO RACE BY AGE AND SEX

Table 2 gives the data on the 331 Negroes diagnosed as tuberculous and furnishes analysis on the lines of age and sex. The original work sheet, too detailed for consideration here, carried the analysis through the 648 cases listed as roentgenologic suspects and the 7,963 cases listed as roentgenologically negative. Although altogether 8,942 Negroes were examined and data charted in a routine manner for each case, owing to reasons of space limitations only the 331 diagnosed cases are considered here.

TABLE 1.—Results by Race and Sex of 9,348 X-Ray Examinations

Race	Total Examined	Reinfection Type		Suspected Reinfection		Negative for Reinfection Type	
		No.	%	No.	%	No.	%
Negro							
Male.....	3,901	150	3.85	288	7.38	3,463	88.77
Female.....	5,041	181	3.59	360	7.14	4,500	89.27
Total.....	8,942	331	3.71	648	7.24	7,963	89.05
White							
Male.....	165	11	6.67	14	8.48	140	84.85
Female.....	175	7	4.00	15	8.57	153	87.43
Total.....	340	18	5.29	29	8.53	293	86.18
Mexican							
Male.....	15	1	6.67	0	....	14	93.33
Female.....	19	1	5.26	1	5.26	17	89.46
Total.....	34	2	5.88	1	2.94	31	91.18
Other races							
Male.....	22	0	....	2	9.09	20	90.91
Female.....	10	0	....	0	....	10	100.00
Total.....	32	0	....	2	6.25	30	93.75
Totals.....	9,348	351	3.75	680	7.27	8,317	88.98

strable tuberculosis found from 3.75 per cent to 4.24 per cent. In comparison with mass surveys reported elsewhere, the percentage seemed rather high. It must be remembered, however, that the district surveyed represents the area of highest mortality in Chicago, 301.6 per hundred thousand. In such a district, surveyed in a routine manner, one may expect an unduly high morbidity in terms of demonstrable disease. As a matter of fact and with reference to both white and Negro, it may be presumed that follow-up and later

The high percentage of roentgenologically demonstrable tuberculosis, as shown in this table, for the age period 50 to 74 is significant. Presumably many or most of these cases were of the chronic, fibroid type and represent "fountains of infection." A tabulation dealing with the type of lesion as revealed by the x-rays

TABLE 3.—*Stage of Disease Against Age and Race*

	Reinfection Type	Minimal		Moderately Advanced		Far Advanced	
		No.	%	No.	%	No.	%
Negro							
14 years and under.....	24	12	50.0	12	50.0	0	...
15 to 19 years.....	37	21	56.8	15	40.5	1	2.7
20 to 24 years.....	32	14	43.7	12	37.5	6	18.8
25 to 29 years.....	32	16	50.0	13	40.6	3	9.4
30 to 34 years.....	30	15	50.0	8	26.7	7	23.3
35 to 39 years.....	27	10	37.1	12	44.4	5	18.5
40 to 44 years.....	32	14	43.7	15	46.9	3	9.4
45 to 49 years.....	24	11	45.8	12	50.0	1	4.2
50 to 54 years.....	32	15	46.9	14	43.7	3	9.4
55 to 59 years.....	21	11	52.4	9	42.8	1	4.8
60 to 64 years.....	17	7	41.2	6	35.3	4	23.5
65 to 69 years.....	13	8	61.5	3	23.1	2	15.4
70 to 74 years.....	8	3	37.5	3	37.5	2	25.0
75 years and over.....	1	1	100.0	0	....	0	....
Unknown adult.....	1	1	100.0	0	....	0	....
Total—Negro.....	331	159	48.0	134	40.5	38	11.5
White							
14 years and under.....	4	2	50.0	2	50.0	0	....
15 years and over.....	14	6	42.8	4	28.6	4	28.6
Total—White.....	18	8	44.5	6	33.3	4	22.2
Mexican							
14 years and under.....	0	0	....	0	....	0	....
15 years and over.....	2	0	....	1	50.0	1	50.0
Total—Mexican.....	2	0	....	1	50.0	1	50.0
Other races—none							
Totals.....	351	167	47.6	141	40.2	43	12.2

confirms this supposition. The tabulation is not given here but the summary shows a marked predominance of fibroid type lesions.

Referring again to table 2, crossing age against sex, taking the adolescents and early adult years, 15 to 29, the increased tuberculosis incidence in the Negro females corresponds roughly with the increased mortality for the period as revealed by the general tuberculosis death rate. Grouping the three periods shown in the table, the incidence for the males is 3.9 per cent against 4.9 per cent for the females. These figures represent an excess incidence for the females of 26 per cent, a ratio which holds for the mortality rate as revealed by the 1939 mortality tables for Chicago. The incidence rate for the children under 14 is also interesting, 0.6 per cent for the males, 1.0 per cent for the females, an average rate for both sexes of 0.8 per cent. This rate is significant. If continued at or about the level quoted, it will exercise an influence in outlining the future scope and purposes of the work.

In laying out the survey, the question arose as to whether children should be accepted for x-ray examination. Was x-ray examination of the children worth while? In a recent school survey comprising over 187,000 Chicago school children, the rate of case incidence under 14 years ran 0.72 per cent for the tuberculin positive children roentgenographed, 0.06 per cent for the total children tested. The rate for the Negro children was 1.01 per cent for the tuberculin positive children roentgenographed, 0.15 per cent for the total

children tested. On the basis of these figures we necessarily had to consider the economic advisability of roentgenographing the children. We decided, however, to follow the original idea and roentgenograph the entire family. Though the futility of child x-ray examination in general groups must be conceded, the results in this area of excessive mortality seem to justify the procedure. An incidence of close to 1 per cent is well worth the effort and expenditure and discloses sidelights of interest from two totally different angles. Such a rate in children, objectively shown by the miniatures, reveals both the density of evolutive infection in areas of high mortality and the superiority of total x-ray examination over the old screen method.

STAGE OF DISEASE AGAINST RACE AND SEX

That serious pulmonary disease in appreciable amount is found in children of the substandard neighborhoods is demonstrated in table 3. In analyzing the twenty-four cases found, 14 years and under, it will be seen that twelve, or 50 per cent of the cases, were moderately advanced.

Studying the table further, it is seen that stage of disease shows a more or less consistent distribution for all age periods. Of much more importance are the figures relative to minimal tuberculosis. In view of the fact that, of the 863 Negroes diagnosed tuberculous in our clinics during 1939, 12 per cent were minimal and 88 per cent advanced, the ratio of minimal cases found in the survey, 48 per cent, must be considered as extremely gratifying. Many of these early cases showed excellent indications for pneumothorax and were referred to the collapse therapy clinic. The financial saving to the community represented by the discovery and prompt treatment of such early cases is obvious.

TYPE OF LESION

Considerable difference of opinion exists as to the possibility of accurately typing lesions from the x-ray plates. The tabulation covering this point is too lengthy for inclusion. The totals, arranged according to the classification decided on by the interpretation committee, run as follows and are submitted for what they are

TABLE 4.—*Incidence of Primary Tuberculosis as Revealed by the Miniatures*

	Cases Diagnosed Reinfection Type		All Cases Examined	
	No.	%	No.	%
Total cases.....	351	100.0	9,348	100.0
Complete primary.....	88	25.1	827	8.8
Incomplete:				
Hilar.....	36	10.3	455	4.9
Parenchymal.....	6	1.7	102	1.1
Total primary.....	130	37.0	1,384	14.8
Suspect primary.....	36	10.3	734	7.9
Primary not visible.....	185	52.7	7,230	77.3

worth: Of the 351 cases diagnosed, 45 per cent were classed as infiltrative, 14.8 per cent as exudative, 11.9 per cent as ulcerative, 0.9 per cent as proliferative, 3.5 per cent as cavernous, 33.6 per cent as fibroid and 10.0 per cent unclassified. Some of the patients, of course, had more than one type of lesion. Needless to say, any such classification is merely tentative and empiric, and sound decision as to type of lesion will have to wait on clinical observation as the patients go through the clinics.

PRIMARY TUBERCULOSIS

The committee again found itself on debatable ground in attempting to outline a classification for primary tuberculosis. The classification finally decided on is given in table 4, and the results are shown both for all films read and for films diagnosed "reinfection type." The table is shown for what it is worth and without the exhaustive analysis which is carried on the work sheets. Details on this and many other points will be furnished in a bulletin to be published later.

In studying the tabulation it is seen that 37.0 per cent of cases diagnosed reinfection type showed visible primary, as against 14.8 per cent for all films read. The significance of this finding is a matter of speculative interest and further research along this line is indicated.

NONTUBERCULOUS PULMONARY CONDITIONS

Of the Negroes examined, 6.4 per cent showed cardiac conditions and 1.9 per cent showed nontuberculous respiratory conditions. The figures for the white persons were 4.7 per cent cardiac and 2.6 per cent nontuberculous respiratory.

THE FOLLOW-UP

Owing to the fact that the work is continuous, the follow-up of the "suspects" is necessarily incomplete. Of the 680 persons diagnosed as having suspect reinfection, 287 have already been reexamined with the 14 by 17 film and more are coming in each day. Of the 287 cases already examined forty-five, or 15.7 per cent, have been diagnosed as pulmonary tuberculosis, 108, or 37.6 per cent, have been diagnosed as negative, and 134, or 46.7 per cent, have continued as suspects. From present indications, follow-up of the suspects represents a productive field and this phase of the program will be further intensified as the survey continues.

SUMMARY AND CONCLUSIONS

In the two months survey, 9,348 persons were roentgenographed and classified, of whom 351 showed roentgenologic evidence of tuberculosis on the original miniatures. Of the 351 cases discovered 167, or 47.6 per cent, were minimal, 141, or 40.2 per cent, moderately advanced and forty-three, or 12.2 per cent, far advanced.

Contrary to the usual concepts and to the trends of the mortality tables, the 340 white persons roentgenographed showed a higher rate of incidence than the 8,942 Negroes.

Total survey, including all members of the family, was justified by the unusually high rate that was found in children.

Total survey through the medium of the miniature film and the mobile x-ray unit is at last an economic possibility and, in view of this new development, case-finding procedures will have to be revised.

The miniature film represents a new and efficient public health instrument destined probably to general acceptance by all communities with a serious tuberculosis problem.

Contrary to the opinion which seems to prevail for the moment in this country, I am convinced that future developments will lie in the direction of a still smaller and a still cheaper film, possibly the 35 mm. film as used by De Abreu of Rio de Janeiro. The technical difficulties involved are not insurmountable and the reduction in cost, reaching as low as a cent per film, constitutes a perennial inducement to further research.

EXPERIENCES WITH SURGICAL TREATMENT IN TEN CASES OF PATENT DUCTUS ARTERIOSUS

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The ductus arteriosus is a vessel which is essential for the fetal circulation but which ceases to be necessary after birth when expansion of the lungs allows more blood to flow through the enlarged pulmonary vascular bed. Having fulfilled its function in prenatal life the ductus normally becomes closed off following delivery of the child. Christie¹ found that 95 per cent of routine postmortem subjects at 12 weeks of age had a closed ductus and that 98.8 per cent of them at 1 year had this vessel obliterated. If the ductus arteriosus remains open during childhood or later life, the passage of blood through it (from the aorta to the pulmonary artery) forms an arterial leak which may assume considerable importance. If the ductus is small, the patient can indulge in reasonable activity and may have a normal life expectancy. If, however, the ductus is relatively large, physical work may be greatly limited and indeed death may follow by one of several mechanisms.

It is difficult to state how frequently the patent ductus arteriosus gives rise to significant pathologic change. A case in which death results from this abnormality is apt to be reported in the literature, whereas cases of the fistula without its major complications usually have little medical recognition as far as journalistic record is concerned. Although internists and cardiologists are cognizant of the fact that occasional patent ductus patients are 50 or 60 years old and in relatively good health, a collective survey of the medical literature would give a somewhat gloomy outlook for the individual who is beginning life with this abnormality. Abbott² has studied ninety-two fatal cases of patent ductus arteriosus in which there were no other cardiovascular abnormalities. In this group 43 per cent died of sudden or slow cardiac failure and 30 per cent died of subacute bacterial endocarditis or endarteritis of the pulmonary artery. The average age at death was 24 years. Bullock, Jones and Dolley³ placed the incidence of bacterial infection at an even higher level. Little attention has been given to the fact that children with a large shunt between the aorta and the pulmonary artery may have a deficient peripheral flow of blood and consequently a retarded physical development. There are now sufficient physiologic observations in this regard⁴ to show that delayed growth may be produced by persistence of the ductus.

To present accurate figures on the incidence of these various complications is impossible at the present time, because no one clinician or clinic has had sufficient experience to compute the prognosis. However, it is evident that subacute bacterial endarteritis, retarded

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From the surgical and medical clinics of the Children's Hospital and the Peter Bent Brigham Hospital.

Read before the Section on Radiology at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.

1. Christie, Amos: Normal Closing Time of the Foramen Ovale and the Ductus Arteriosus, *Am. J. Dis. Child.* **40**: 323 (Aug.) 1930.

2. Abbott, M. E.: *Atlas of Congenital Cardiac Disease*, New York, American Heart Association, 1936.

3. Bullock, L. T.; Jones, J. C., and Dolley, F. S.: The Diagnosis and the Effects of Ligation of the Patent Ductus Arteriosus, *J. Pediat.* **15**: 786 (Dec.) 1939.

4. Burwell, C. S.; Eppinger, E. C., and Gross, R. E.: The Effects of Patency of the Ductus Arteriosus on the Circulation, *Proc. Soc. Clin. Investigation*, to be published.

physical growth and heart failure are frequent enough to warrant surgical attempts at closure of the ductus in selected cases with the hope of diminishing the incidence of these sequelae. In February 1939 Gross and Hubbard⁵ published a report of the first successful ligation (August 1938) of a patent ductus arteriosus. In March 1939 Gross⁶ described an operative approach for this procedure and listed four cases in which this had been performed without mortality. In September 1939 these cases were presented in greater detail.⁷ This series has now been extended to ten surgically treated children and adults,⁸ observations from which form the basis of the present communication.

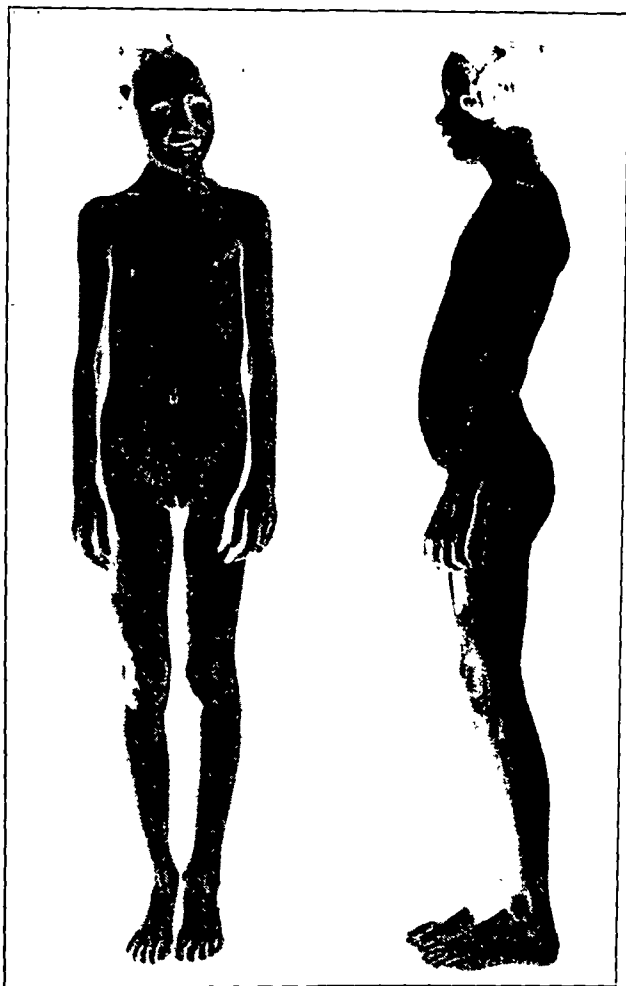


Fig. 1.—Appearance of 11½ year old girl (patient 5) showing the slender, underweight habitus which is common in children with a large patent ductus arteriosus. Patient's weight 57 pounds (26 Kg.); expected average normal, about 75 pounds (34 Kg.).

SYMPTOMS AND SIGNS

There has been a widespread tendency to classify individuals with a patent ductus arteriosus merely as having "congenital heart disease," but now that surgical therapeutic procedures are available for alleviation or

cure of this lesion it is important to find the ways in which the abnormality can be recognized. Considerable study of the problem has convinced me and my medical confrères that the correct diagnosis can be made with a high degree of accuracy. The basis for this statement lies in the fact that a patent ductus was found in each of the cases in which exploration was done and in only one child was there an additional cardiovascular abnormality. It is therefore worth while listing the symptoms and signs which are now believed to be characteristic of the patent ductus.

The physical manifestations of this lesion may be entirely lacking in infancy and are apt to be confusing in the first two or three years of life but are almost always typical after the fourth year. Auscultation of the heart at birth or shortly thereafter may give negative results. This is exemplified by patient 6, who, though several competent observers heard no murmurs during the first year of life, was found to have a very loud murmur at 4 years of age. More commonly the patient has a murmur during the neonatal period which is difficult to place and time accurately because of the rapid heart rate, the fast respirations and the small size of the chest. As a child reaches the third or fourth year of life, a murmur develops which has several rather distinct features. It is continuous but is accentuated during systole. In whole or in part it is widely transmitted over the precordium, to the axillae and to the back, but it has a maximum loudness in the second or third interspace to the left of the sternum. In contrast to the "blowing" or "harsh" murmur of pulmonic stenosis or coarctation of the aorta, it has an unmistakable rumbling quality which is well described by the term "machinery murmur." The second pulmonic sound is almost always increased in intensity (if it is not overshadowed by the intense murmur), in contrast to the diminished or absent second sound in stenosis of the pulmonic valve. Cases are described in the literature as presenting only a systolic murmur (the ductus presumably being small) but in all of our cases the murmur was a continuous one.

A very coarse, precordial thrill, systolic in time or continuous with systolic accentuation, and most prominent over the pulmonic region, was a routine observation. Some did not develop this until the third or fourth year of life, and indeed cases have been observed in which the ductus is small and a thrill absent. The thrill may be quite intense and the patient or another member of the family is often conscious of a "buzz" within the chest.

The heart is usually slightly enlarged. It has a beat of accentuated vigor and a rate which is possibly somewhat increased. Following exercise the heart rate and the intensity of beat are above the expected normal response.

The blood pressure shows no significant change in its systolic level, but there is a low diastolic figure if the ductus is large. Thus the leak from the aorta may be sufficient to produce a significant fall of peripheral pressure when the aortic valve is closed (during diastole). If this loss is great enough, a water hammer pulse or a visible capillary pulsation can be detected on examination of the peripheral vascular system.

The physical development of the individual may be retarded, but this is not universally true. About half of our patients were underweight and quite slender, as depicted in figure 1. When patency of the ductus is the sole lesion, cyanosis is never observed unless the heart is failing and death is impending.

5. Gross, R. E., and Hubbard, J. P.: Surgical Ligation of a Patent Ductus Arteriosus: Report of First Successful Case, *J. A. M. A.* **112**: 729 (Feb. 25) 1939.

6. Gross, R. E.: A Surgical Approach for Ligation of a Patent Ductus Arteriosus, *New England J. Med.* **220**: 510 (March) 1939.

7. Gross, R. E.: Surgical Management of the Patent Ductus Arteriosus with Summary of Four Surgically Treated Cases, *Ann. Surg.* **110**: 321 (Sept.) 1939.

8. These cases were extensively studied and referred for treatment by Dr. J. P. Hubbard, cases 1 and 3; Dr. J. P. Hubbard and Dr. L. K. Diamond, case 6; Dr. W. R. P. Emerson and Dr. Hyman Green, cases 2 and 5; Dr. C. S. Burwell and Dr. E. C. Eppinger, case 4; Dr. S. A. Levine and Dr. Fresenius Van Nuyse, case 7; Dr. J. E. Carroll of Hartford, Conn., case 8; Dr. P. D. White and Dr. H. B. Sprague, case 9, and Dr. K. D. Blackfan, case 10.

The history may reveal varying degrees of cardiac embarrassment. If the ductus is small, no impairment of physical activity will be found; if the fistula is large, a moderate but definite limitation in exercise is the rule; if the ductus is widely patent, frank failure may supervene. In one of our patients (17 years old) there had been recurring bouts of palpitation, dyspnea and



Fig. 2.—Seven foot roentgenogram (patient 8) showing three appearances usually associated with patent ductus arteriosus: (1) increased cross diameter of heart (transverse diameter of heart 10 cm., internal diameter of chest 17.6 cm.); (2) increased prominence of pulmonary artery (indicated by arrows) (3) vascular congestion in lung fields. The heart was unusually active, as shown by fluoroscopic and kymographic studies.

peripheral edema for many years, while a woman of 26 had marked orthopnea for three years. In rare cases there may be sudden collapse or death, much the same as that encountered with aortic valve insufficiency.

larger volume of blood per minute and the right ventricle must pump against a raised pressure in the pulmonary arteries. An additional load therefore falls on both sides of the heart, and it is not surprising to find that the electrocardiogram usually shows no axis deviation. In only one of our ten cases was there any axis-deviation, a slight left preponderance being present in case 8; the other nine gave normal tracings. Well authenticated cases have been described in which there was a definite left axis or right axis deviation, but the finding of an abnormal electrocardiogram should at once arouse suspicions of some other cardiac lesion. This is particularly true of right axis deviation, which is suggestive of pulmonary valve stenosis.

ROENTGENOLOGIC OBSERVATIONS

Because the roentgenologic changes in the heart, great vessels, and lungs are being presented by Dr. Eppinger⁹ I will not describe them here. Suffice it to say that the finding (fig. 2) of cardiac enlargement, prominence of the pulmonary artery, increased pulsation of the heart and great vessels and pulmonary congestion is not enough in itself to warrant making a diagnosis of a patent ductus arteriosus. However, it is valuable confirmatory evidence in establishing this diagnosis when evaluated with the clinical history, physical observations and electrocardiographic studies.

INDICATIONS FOR OPERATION

When it is reasonably certain that a given person has an uncomplicated patent ductus arteriosus, the question arises whether or not surgical obliteration of this vessel should be performed. The dangers of the untreated abnormality must be balanced against the possible hazards of operation. If the patient's chances for developing important complications appear to be relatively high, the risks of surgery can be taken with impunity. Hubbard, Emerson and Green¹⁰ have

pointed out that each case should be evaluated, for by no means should all these individuals be subjected to operative treatment. The fact that some people live a relatively long and active life (particularly if the ductus is small) should make the clinician cautious in advising surgical treatment. It is possible that views may change as experience is broadened, but the following points sum up our present attitude with regard to criteria for selection of cases for surgery:

Shortcircuiting of blood through the fistula can so diminish the peripheral flow that the physical development is significantly retarded. When this occurs there is clearly a justification for closure of the ductus. This indication for operation is largely concerned with children from 5 or 6 years up to adolescent ages.

The deviation of blood by way of the shunt may be counter-balanced (in some cases) by an appreciable increase in the left ventricular output per minute. In this way the peripheral flow of blood can be maintained at or near normal and the individual will develop properly; but in attaining these ends the heart is so overworked that it eventually fails. Physiologic studies on some of our older patients⁴ clearly show that the left ventricular output was two or three times the expected normal, and hence it is easy to understand why cardiac failure should occur. While decompensation appeared in case 4 at the age of 6 years, it is rarely seen before puberty. If it is ever to be a serious menace, it almost invariably manifests itself before the age of 30. In other words, if a man or woman has arrived at the age of 30 or 35 without history or evidence of decompensation, the chances are good that it will not be found at

ELECTROCARDIOGRAPHIC OBSERVATIONS

When the ductus arteriosus remains open the left ventricle must pump a

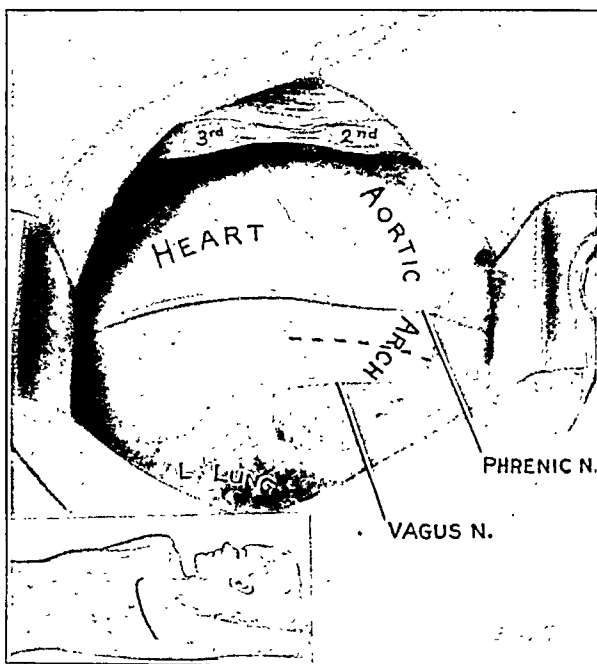


Fig. 3.—Operative approach to the ductus arteriosus. Inset shows position of patient and of the cutaneous incision. The chest is entered through the second interspace and the second and third costal cartilages have been cut. The pleural covering of the mediastinum will be opened along the dotted line.

a subsequent period. The presence of (or history of) cardiac failure in any form is a definite indication for operation. This should be extended to include any cardiac embarrassment, even though frank failure does not exist. Under this broad category would be appreciable enlargement of the heart, undue increase in its

9. Eppinger, E. C., and Burwell, C. S.: The Mechanical Effects of Patent Ductus Arteriosus on the Heart and Their Relation to the X-Ray Signs, to be published.

10. Hubbard, J. P.; Emerson, P. V., and Green, Hyman: Indications for Surgical Ligation of a Patent Ductus Arteriosus, *New England J. Med.* 221: 481 (Sept. 28) 1939.

rate and beat after mild exercise and overactive cardiac impulse by physical or fluoroscopic examination.

In the presence of a patent ductus arteriosus, the lungs receive blood from the venous circulation by way of the right ventricle, and in addition blood pours

formed is only a ligation of the ductus, and while complete obliteration of the vessel can be accomplished in some cases, there are others in which a tiny pinhole opening persists no matter how tightly the ligatures are applied. These facts are evident by the complete absence of postoperative murmurs in some cases and persistence of minimal ones in others. It is therefore evident that ligation of a ductus can greatly diminish the mechanical burdens of a heart and can improve the peripheral circulation of the patient, but at the same time a small opening can maintain some swirling of pulmonary artery blood and still keep alive the danger of subacute bacterial endocarditis. I therefore believe that—with the operation which is now practiced—there is little justification for submitting individuals to surgery solely for the theoretical prevention of future endocardial or pulmonary artery infection. If, however, a method can be devised whereby the ductus is completely divided and the operative mortality can be kept at a low figure, then it would be worth while operating on practically all these patients in the hope of diminishing subsequent endocarditis or endarteritis. Toward the goal of developing a method for safely dividing the ductus I have spent considerable time in the laboratory and have found a way which promises to furnish this additional step without undue risk. The opportunity has not yet presented itself to attempt this in a human case.

A final discussion of indications for operation is concerned with the individual who already has a superimposed *Streptococcus viridans* infection which will presumably terminate fatally. Theoretically, closure of the ductus may diminish eddying of blood in the pulmonary artery, limit the formation of bacterial vegeta-

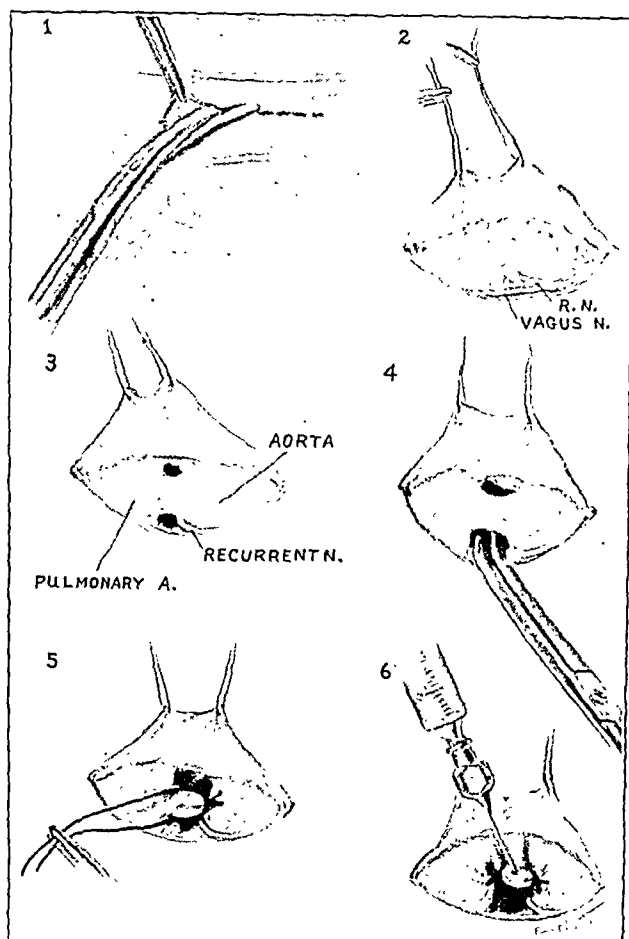


Fig. 4.—Details of operative exposure of the ductus: 1. Base of heart and great vessels; parietal pleura being opened along the dotted line. 2. Presenting fat and areolar tissue dissected to isolate the recurrent laryngeal nerve. 3. Ductus completely freed of overlying fat. 4. Posterior wall of ductus freed by blunt dissection. 5. Double ligatures in place, and one of them has been tied. 6. Both ligatures tied; sclerosing fluid is being injected between them.

in at high pressure from the aorta. It is therefore evident that the amount of blood in the pulmonary vascular bed is greater than normal, the increment depending directly on the size of the ductus and the pressure within the aortic arch. Because of this increased volume of pulmonary blood, the vital capacity is reduced and orthopnea may appear. Thus, orthopnea per se is not necessarily evidence of a failing heart, but indeed it might be brought about by an overcompensated left ventricle which is forcing increased amounts of blood into the aorta and thereby into the lungs. The striking symptomatic improvement in a woman of 26 (case 9) who had had orthopnea for three years has certainly made this symptom an indication for operation.

Regarding the dangers of a future *Streptococcus viridans* infection as a justification for operation, I believe there is considerable room for debate. Theoretically, if the fistula could be closed off and the swirling of blood in the pulmonary artery be thereby abolished, the subsequent incidence of fatal bacterial infection would probably be reduced. However, the operation which I, and subsequently others, have per-



Fig. 5.—Patient 2 on first postoperative day. These patients have little discomfort if the operative procedure is carefully done.

tions and permit existing ones to be better treated by chemotherapy. This optimistic view must be discounted by the fact that a ductus or pulmonary artery which is the seat of bacterial vegetations is apt to be eroded and friable and hence may rupture if disturbed by the surgeon's manipulations. Tourouff¹¹ has recently oper-

11. Tourouff, A. S. W.: Personal communication to the author.

ated on four such patients. Two died on the table from fatal hemorrhage, one still has positive blood cultures fourteen weeks after operation and a fourth has been apparently cured of her bacteremia sixteen weeks after operation. It can be argued that any risk is defensible

TABLE 1.—Summary of Ten Cases of Patent Ductus Arteriosus in Which Surgical Ligation Was Done

Patient	Age	Sex	Indications for Operation*				Postoperative Result
			Re-tarded De-velop-ment	Car-diac Em-barras-sment	Car-diac Fail-ure	Ortho-pnea	
1	7	♀	++	+	..	..	Improved
2	11	♂	++	++	..	..	Improved
3	7	♀	++	++	..	..	Improved
4	17	♀	..	..	+++	..	Improved
5	11	♀	++	+	..	..	Improved
6	6	♀	+	+	..	..	Slightly improved†
7	15	♀	+++	++	..	..	Died‡
8	5	♀	+	..	..	..	Improved
9	26	♀	..	+++	..	+++	Improved
10	10	♀	..	++	..	..	Improved

* An attempt has been made to show the severity of the preoperative conditions by +, ++ and +++.
† Besides the patent ductus arteriosus, this girl has some other cardiac abnormality and has had only slight improvement from operation.
‡ Patient died two weeks after operation from Staphylococcus aureus infection.

which offers the least hope of curing these desperate cases. I have not yet subscribed to this rationale, because some individuals with subacute bacterial endocarditis live many months in fairly good general health while a surgical patient with a ruptured ductus will probably be dead in a few minutes. Hence I have not chosen to treat such persons surgically; but further experience may show that the operation has merit if used when the infection is of short standing and the vessel walls are not yet ulcerated and thinned out.

OPERATIVE TECHNIC

It is not within the scope of this presentation to describe extensively the operative technic, which has been given in detail in previous communications.¹² Briefly, the ductus can be adequately and safely brought into view by an approach through the left anterolateral chest wall (fig. 3), traversing the left pleural cavity, temporarily collapsing the left lung, opening the parietal

TABLE 2.—Changes of Weight in Thin Children Following Ligation of the Patent Ductus Arteriosus

Record of Weight					
Before Operation			After Operation		
Case	Sex	Age, Years	Weight, Pounds	Interval, Months	Weight Gain, Pounds
1	♀	7	48	15	12
2	♂	11	62	18	22
3	♀	7	42	12	8
5	♀	11	57	4	10

pleura of the mediastinum (fig. 4) and then dissecting down between the great vessels. The cutaneous incision can be made above or below the nipple, and in the adult woman it could be made below the entire breast. Entry through the second space gives a good exposure, provided the intercostal muscles are divided well around into the axilla. Great care and patience must be exer-

cised in freeing up and isolating the ductus for fear of injuring it or the regional structures. The ductus has always been so short that I have not dared to divide it in any instance. Heavy braided waxed silk ligatures were used in all of these cases and this was supplemented in the more recent ones by injecting a sclerosing fluid between double ligatures. It is difficult to describe just how tightly the ligatures must be applied, for this can be determined only by experience with some of these operations. If the ties are too loose, a small fistula may persist; if they are too tight there is danger of their cutting through the vessel. Following ligation of the ductus, the left lung is reexpanded with positive pressure by the anesthetist, and the chest is closed.

The anesthetic in eight cases was cyclopropane, but in the other two ether in a closed system served quite well. In no case has an intratracheal tube been used, since a tightly fitting face mask adequately permitted positive pressure expansion of the lung whenever this was necessary.

If the operation is carefully done, it is tolerated very well and there is little postoperative reaction (fig. 5). Some of these patients have been out of bed on the first or second day, and hospitalization of more than seven to ten days after operation is seldom necessary.

RESULTS OF OPERATION

In the present series of ten¹³ surgically treated patients (table 1) one died two weeks after operation from a Staphylococcus aureus infection and one proved to have a complicated cardiac abnormality and has derived only slight benefit from operation. The other eight individuals have all shown a progressive and gratifying improvement. The ways in which they have been altered may be analyzed as follows:

Patients 1, 2, 3, 5 and 7 each had important retardation in physical growth prior to operation. The first four of these have now been followed long enough to gain a clear idea of the results of the surgical undertaking. It has been surprising to observe the physical alterations which are typified by the weight gains shown in table 2. This postoperative change was most marked in case 2, in which there was a gain of 22 pounds (10 Kg.) in eighteen months after ligation of the ductus. These augmentations in weight have been particularly significant since they occurred in children who previously were thin and poorly nourished, in spite of medical efforts to combat this condition. In short, closure of the fistula allows more blood to flow to the periphery, so that the physical development is improved.

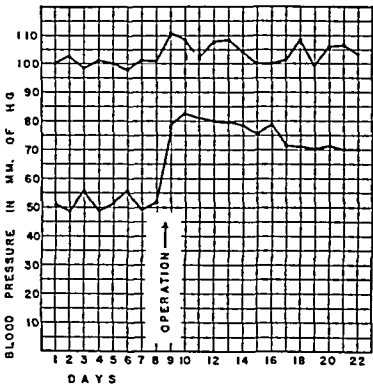


Fig. 6.—Typical blood pressure before and after ligation of a patent ductus arteriosus (case 5). If the ductus is large, the diastolic pressure is low. On ligation of the ductus, the diastolic pressure immediately rises to normal.

13. Since completion of this manuscript two more patients, aged 22 months and 7 years, have been successfully operated on. There has been complete disappearance of the murmurs in both of them.

12. Gross (footnotes 6 and 7).

A rise in diastolic blood pressure was found after operation in each case. In case 6 the ductus was relatively small and after its ligation the diastolic pressure rose only from 10 to 15 mm. of mercury. In all other cases (including case 7) there was an immediate rise of the diastolic level from its low preoperative level of 30 to 50 mm. of mercury to a normal value of 70 to 75 (fig. 6). In some cases there was a tendency for the diastolic pressure to be slightly higher than normal for from five to seven days after operation, following which it assumed a normal value.

The physical activity of patient 6 has been improved to only a slight degree, but in the other eight surviving individuals there has been a definite improvement in capacity for exercise. This has not been quantitatively tested on a treadmill or other mechanical device, but patients have volunteered the information that they "could run farther," that the "heart did not speed up the way it used to," that there was "no more palpitation" after moderate exercise, that "the heart does not pound the way it did formerly," and so on. An improved peripheral circulation was spontaneously noticed by several patients, who found that their feet and hands were warmer than they had been previously during cold weather, and this observation was further substantiated by physical examination of the extremities.

One individual (patient 4) who had had attacks of frank cardiac decompensation as often as two or three times a year before operation has now gone eighteen months since operation without evidence of failure at any time, in spite of the fact that she has been indulging much more in outdoor sports.

Finally, there was a 26 year old woman (patient 9) who would become dyspneic from light housekeeping duties and who had been primarily bothered by orthopnea, which necessitated sleeping in a semisitting position for the last three years. Under observation in the hospital she could not be encouraged to lie down flatly on a table or bed for more than from ten to fifteen minutes because she would become choked up, uncomfortable and short of breath. Since operative ligation of her patent ductus, she carries on normal household work and has been able to sleep all night in a flat position without any difficulty.

SUMMARY AND CONCLUSION

The accuracy with which it is possible to make the diagnosis may be judged by the fact that exploration was done in ten cases and a patent ductus found in each. In only one case was there another cardiovascular abnormality. Operation should be advised only for carefully selected cases. With the procedure which is now employed (ligation), it is not felt that complete obliteration of the vessel can be accomplished in all cases; hence it is not believed that all individuals with a patent ductus arteriosus should be operated on in the hope of preventing subacute bacterial endocarditis. If, however, a procedure can be developed by which the ductus can be completely but safely severed, it will be justifiable to employ the operation more extensively to diminish the incidence of *Streptococcus viridans* infection. A review of our material shows that ligation of the patent ductus arteriosus is productive of excellent postoperative results when used for patients who have retarded physical development or evidence of cardiac embarrassment.

300 Longwood Avenue.

THE MECHANICAL EFFECTS OF PATENT DUCTUS ARTERIOSUS ON THE HEART

AND THEIR RELATION TO THE X-RAY SIGNS

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AND

C. SIDNEY BURWELL, M.D.

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The appearance of the heart shadow on the x-ray film or screen is determined partly by the structure of the heart and partly by what William Harvey called "the movements of the heart and blood." The dynamic events which accompany the pumping of blood influence the size and shape of the shadow, the excursion of its borders, the pulsation of the great vessels and even the volume of blood in the adjacent lungs. Much has been learned about the dynamics of the heart through the medium of the x-rays; it is possible that something may be learned about x-ray signs by a study of circulatory dynamics.

The brilliant operation described by Gross¹ provided the opportunity for making measurements of the circulation of patients with patent ductus arteriosus.

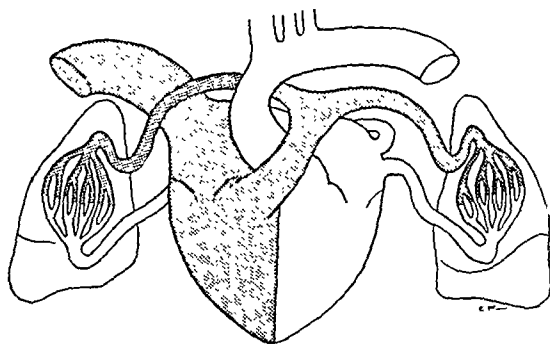


Fig. 1.—The flow of blood in a normal person.

Figure 1 illustrates the flow of blood in a normal heart. In a resting individual about 4 liters of blood per minute returns from the periphery and the same amount is pumped out by the right ventricle, passes through the lungs, enters the left side of the heart and is pumped out by the left ventricle. It is thus clear that the outputs of the right and left ventricles are essentially identical in the normal individual. However, a different situation is created by a patent ductus arteriosus, since the ductus arteriosus connects the aorta with the adjacent pulmonary artery (fig. 2).

Studies made on Gross's patients have led to the acquisition of important information with regard to the circulation in these patients, which may be summarized as follows:

1. A stream of blood flows from the aorta to the pulmonary artery through the ductus; this flow is going on during both systole and diastole. This blood, shunted from the aorta without having gone to irrigate the periphery, returns through the lungs to the left side of the heart which it just left. Thus, the shunted stream serves no useful purpose. It should be emphasized that this is not a situation in which venous blood enters the

From the Department of Medicine, Harvard Medical School, and the Medical Clinic of the Peter Bent Brigham Hospital.
Read before the Section on Radiology at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.
1. Gross, R. E., and Hubbard, J. P.: Surgical Ligation of a Patent Ductus Arteriosus: Report of First Successful Case, J. A. M. A. 112: 729 (Feb. 25) 1939.

arterial system but one in which arterial blood is entering the pulmonary system. Since blood in the arterial system is not diluted by venous blood, these patients are not cyanotic. Under the conditions of operation from 45 to 75 per cent of the blood pumped out by the left ventricle into the aorta passes back through this short circuit into the pulmonary artery (Eppinger, Burwell and Gross²).

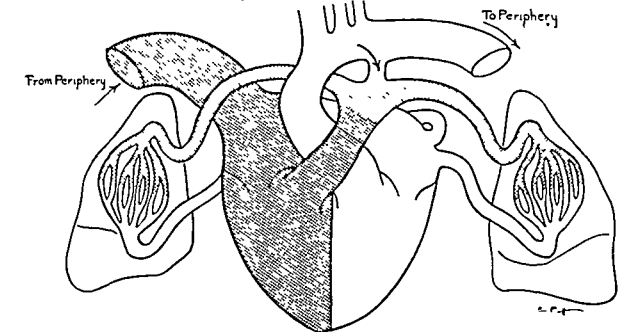


Fig. 2.—The flow of blood in a patient with patency of the ductus arteriosus.

2. That portion of the blood in the aorta which is not shunted goes to the periphery and returns to the right ventricle. Therefore, a situation is created in which the right ventricle has only one source of blood (i. e. the peripheral circulation) while the left ventricle has two sources of blood (i. e. the blood from the right ventricle and the blood returning through the short circuit). In the cases studied the left ventricle had to pump from two to four times the amount of blood put out during the same time by the right.
3. The leakage of blood from the high pressure aorta to the lower pressure pulmonary artery is accompanied by a fall in the peripheral diastolic pressure and a slight rise in the pulmonary artery pressure. To emphasize the magnitude of these changes we present in table 1 the actual measurements of the blood flow before and after operation.

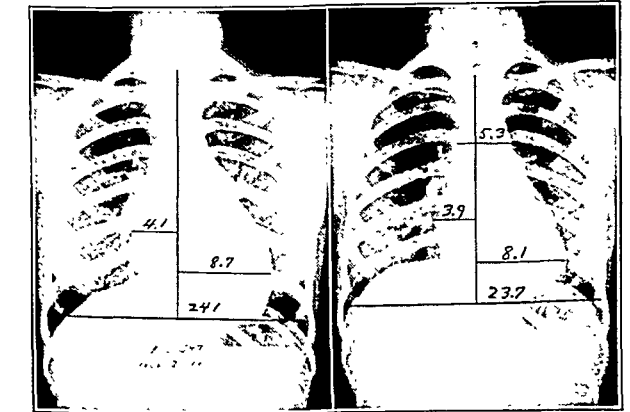


Fig. 3.—Anteroposterior appearance before and after ligation of the ductus.

These deviations from normal in the movement and distribution of blood suggest certain signs which should be sought in the x-ray examination by film, fluoroscopy and kymogram.

- These include the following:
1. The greatly increased output of the left ventricle indicates the possibility of the enlargement of this chamber.
 2. Eppinger, E. C.; Burwell, C. S., and Gross, R. E.: The Effects of Patency of the Ductus Arteriosus on the Circulation, to be published.

2. Since both the left ventricle and the pulmonary artery are transmitting with each beat an increased volume of blood, they may be expected to show an increased pulsation.
3. Since the pulmonary artery receives blood from two sources, and since it has been seen at operation to have overflowed, the silhouette of this artery may exhibit unusual prominence.
4. Because of the increased flow of blood into them, the pulmonary vessels may show the signs of engorgement.
5. The combination of increased inflow and engorgement may lead to increased pulsation of the pulmonary artery branches.
6. If a normal mitral valve is not wide enough to transmit this large amount of blood without an elevated left auricular pressure, there may be a visible dilatation of the left auricle. (It may be mentioned that one of our patients before operation showed a mid-diastolic apical murmur characteristic of mitral stenosis. Since ligation of the ductus this murmur has never been heard.)

These six signs were then sought in the films and in the recorded fluoroscopic examinations of the nine patients operated on by Gross. In this search we had

TABLE 1.—Actual Measurements of Blood Flow Before and After Ligation of the Ductus

Patient Number	Blood Flow Before Operation		Volume of Shunt, Liters	Percentage of Shunt	Blood Flow After Operation, After Peripheral and Pulmonary, Liters	
	Peripheral, Liters	Pulmonary, Liters			Peripheral, Liters	Pulmonary, Liters
2	5.9	25.4	19.5	77	5.1	6.2
3	...	19.1	...	...	6.2	6.2
5	4.8	8.7	3.9	45	5.3	5.3
6	6.0	14.1	8.1	57	6.3	6.3

TABLE 2.—Occurrence of the Predicted X-Ray Signs in Patency of Ductus Arteriosus

	Patient								
	1	2	3	4	5	6	7	8	9
Left ventricle enlargement.....	++	++	++	++	++	0	++	++	++
Increased pulsation of left ventricle and pulmonary artery.....	++	0	+++	+++	++	+	++	×	+
Prominent pulmonary artery.....	++	++	++	+	+	+	?	+	++
Pulmonary congestion.....	+++	++	++	++	++	+	+++	++	++
Dilated left auricle.....	++	+	+	+++	+	×	+	+	+
"Hilar dance".....	++	0	0	0	+	0	0	0	+

the indispensable aid of Dr. M. C. Sosman and Dr. G. M. Wyatt.

The frequency with which these signs were found is shown in table 2. An attempt was made to estimate the degree of deviation from the normal, which is expressed as 1 +, 2 + or 3 +.

Left ventricle enlargement of a moderate degree was present in eight of the nine cases. Increased pulsation of the left ventricle and pulmonary artery was present in seven of eight and not recorded in one case. A prominent pulmonary artery was observed in eight out of nine and was questionable in one. Perhaps the absence of visible prominence in this one case was due to the great enlargement of the left auricle, which may have obscured the shadow of the pulmonary artery. An increased volume of blood in the pulmonary vessels (pulmonary congestion) was demonstrable in all cases. A dilatation of the left auricle, usually of mild degree and best seen in the right anterior oblique view, was observed in the eight cases in which appropriate plates were made. The so-called hilar dance of traditional value was present in only three of the nine cases.

Examples of some of these observations are shown in figures 3, 4 and 5, in which the x-ray phenomena before and after ligation of the ductus are demonstrated. Figure 3 is a reproduction of seven-foot plates of the heart before and after operation. They illustrate the enlargement of the left ventricle, the prominence of the



Fig. 4.—Right oblique appearance before and after ligation of the ductus.

pulmonary artery and pulmonary congestion, all of which are less marked after the operation. Figure 4 is a reproduction of films taken obliquely and illustrates particularly the change in the size of the left auricle which followed ligation of the ductus. The x-ray kymograms (fig. 5) illustrate in some degree the increased pulsation of the left ventricle, the pulmonary artery and the pulmonary artery branches, although these pulsations were more clearly observed on the fluoroscopic screen. There is an impressive contrast between the violently overactive left ventricle with the ductus open and the relatively calm left ventricle after ligation.

CONCLUSIONS

The analyses of these cases leads to the conclusion that the x-ray signs suggested by the observed changes in the circulation are usually present in patients with patent ductus arteriosus.

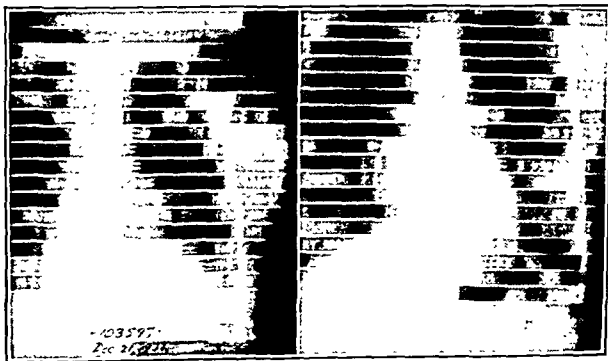


Fig. 5.—Kymogram before and after ligation of the ductus.

On the whole the signs are not sufficiently specific to supply final testimony concerning the diagnosis of patent ductus arteriosus. However, if the relation of these x-ray signs to the dynamics of the circulation is understood, appropriate x-ray studies may (1) suggest the diagnosis, (2) contribute important confirmatory evidence and (3) bear important witness as to the effectiveness of therapy.

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ABSTRACT OF DISCUSSION

ON PAPERS OF DR. GROSS AND DRS.
EPPINGER AND BURWELL

DR. CLAUDE S. BECK, Cleveland: Rarely in this day does a surgeon perform an operation that will be recorded in the pages of medical history. Nevertheless, this was accomplished by Dr. Gross when he successfully placed a ligature around a patent ductus arteriosus. This operation, done in August 1938, ended a forty year period of sporadic and casual interest and began an era which in two years has produced many successful cases. As far as can be determined from the literature, the original idea came from John Monro of Boston, who carried out dissections on infants and proposed the operation to the Philadelphia Academy of Surgery in 1907. There is no record of the operation having been attempted by Monro. In 1924 Holman and I carried out experiments in which we attempted with some measure of success to prevent the patent ductus from closing in newly born dogs. This was done by producing a stenosis of the pulmonary artery. We, as well as a number of other surgeons, were interested in applying the idea to patients, but there were no patients for operation. The operation had never been performed and the medical men who saw these patients did not have them operated on. For this reason I believe I should mention the name of John Hubbard, who referred the patient on whom the first successful operation was done. The first attempt to carry out the operation was by Strieder in 1937. Strieder's patient had bacterial endarteritis before operation, and at operation an anatomic condition was found which made the passage of a ligature impossible. Plication sutures were used and the communication was not completely closed. The bacterial infection persisted and the patient died several days after operation. These ten operations by Gross are a most amazing record of success. To these can be added other records of achievement—thirteen patients by Bullock, Jones and Dolley of Los Angeles, one by Bigger of Richmond, one by Gurd of Montreal and one or more by Holman of San Francisco. Last week at the meeting of the Thoracic Surgical Association in Cleveland, Touroff and Vesell reported operations on four patients with bacterial endarteritis and septicemia. These heroic operations in cases of infection deserve special comment, because one patient has been free from infection for nineteen weeks since operation, one has had improvement in the circulation but infection persists seventeen weeks after operation, and two died of hemorrhage at operation. It would appear, therefore, that the presence of infection in the blood stream is not always a contraindication to operation. Touroff believes that active vegetations in the left side of the heart or in the aorta preclude operative intervention. If the infection is recent in terms of days or weeks so that significant vegetations have not formed, it would appear that success is still possible. Perhaps one can look forward to the day when the defect in the aorta and the pulmonary artery can be closed by direct arterial suture.

DR. WILLIAM D. STROUD, Philadelphia: Ever since hearing the discussion of this operation at the St. Louis session last year, I have been skeptical concerning it. Congenital heart cases fall into three classes: The first includes those in which the maldevelopment was so great that a few days, a few weeks or a few months was all the patient could expect. The second group includes cases showing clubbing of the fingers and toes, marked cyanosis and breathlessness with poor physical development. Here all the physician can do is to encourage the family and attempt to arrange proper educational facilities, occupational therapy and vocational training until tuberculosis, pneumonia, subacute infective endocarditis or heart failure causes the end. The third group, and the one in which I had always considered patent ductus arteriosus, includes patients with signs of congenital maldevelopment of the heart but in whom it apparently has very little effect from the standpoint of development, length of life and circulatory efficiency. The cardiologist's job in these cases was to persuade the family and the patient he was not a hopeless cripple, which other physicians had persuaded him he was. Last Friday Dr. Shapiro read an interesting paper on this subject before the American Heart Association. He feels, as I

had felt until this morning, that bacterial endocarditis is relatively rare in these cases. I was much surprised to hear from Dr. Gross that it occurred in 40 per cent, and he may be right. I looked up ten patients whom I had seen in the past twenty years. So far none of them had died or shown evidence of congestive heart failure and none have developed bacterial endocarditis. I therefore feel we must be careful in considering this operation merely because of the possibility of bacterial endocarditis. A discussion as to whether or not an operation is indicated after bacterial endocarditis has developed is interesting because of recent reports of successful removal of arteriovenous aneurysm in which bacterial endocarditis has developed. I should like to ask whether there is any truth in the suggestion that this operation might be contraindicated as other congenital defects are so common with a patent ductus arteriosus and that the latter might be a compensatory mechanism, especially in the presence of congenital pulmonary stenosis with or without a patent interventricular septum. From what the authors said, the blood is just shunted back and forth through the patent ductus arteriosus and therefore is of no value. If this is true I cannot see how a patent ductus arteriosus could be a compensatory mechanism. The improvement in bodily development following this operation is most interesting. Some of my patients are definitely underdeveloped in spite of the fact that they have no breathlessness or apparent circulatory insufficiency. Perhaps such maldevelopment is a worthy factor in considering this operation.

DR. HARRY VESELL, New York: Praise is due Dr. Gross for showing that this operation can be done with reasonable risk and success in uninfected cases. I want to confine my remarks to cases of patent ductus arteriosus in which bacterial infection is superimposed. Dr. Touroff and I had the good fortune of observing a woman aged 29 who had patent ductus arteriosus with a superimposed infection which we considered rather severe because of the presence of a large number of colonies in the blood cultures. Two were taken before operation; one in the flask showed a great number, and one that was plated out showed 400 colonies per cubic centimeter. The patient had a very septic temperature. After a week she was operated on. Several days after operation, two successive blood cultures were negative. Six or seven further blood cultures were taken and they were negative. She had a more or less uneventful course thereafter and is now, nineteen weeks after operation, back at work and feeling perfectly well. One point that I wish to emphasize is the question of valve infection in these cases when subacute infection is superimposed. Cases collected particularly by Dr. Blumer indicate that infection of the valves does occur, and as indicated by Dr. Blumer and also Dr. Abbott this valve infection is a more or less late phenomenon. In spite of the fact that many cases have been observed to go along for a period up to two years and then come to autopsy, a considerable percentage of them, even after that period of time of infection, up to two years, failed to show infection of the valve. Certainly infection of the aortic and mitral valve would be a great handicap to any expectation of success from the operation. In view of the fact that these valve infections occur late, I think it is incumbent on us, if we consider the operation at all, to have it done very early, just so soon as the diagnosis of infection on the patent ductus can be made.

DR. MAUDE E. S. ABBOTT, Montreal: I am very happy to have the opportunity of hearing Dr. Gross. He has revolutionized the outlook on the therapeutic aspects of congenital heart disease. Of course, the patent ductus does seem the most gettable anomaly for surgical intervention, but we have not ended there and it is a great event in this field. The fact that he has done nine cases successfully and in such a simple way, with recovery so quickly as in the first several of these cases, is really miraculous. I believe the most favorable time, as said by Dr. Gross and the others who have operated, to be in early childhood; that is, 7 or 8 to 10 or 12, because, as the last speaker pointed out, of the likelihood of the later development of infective valvular disease. We all know that the first onset one sees of bacterial endocarditis is around the pulmonary end of the ductus and these later valvular lesions come on after some little time, so the favorable time is before the onset of widespread subacute bacterial endocarditis. I had the oppor-

tunity in March of seeing one of Dr. Touroff's patients, a girl of 18 who had been successfully operated on, January 27. She had a large number of colonies in the blood stream and is now apparently quite free from infection with no fever, the blood culture is sterile and she is back at her office work apparently in perfect health. This is a great record of achievement. If the operation extends to cases of bacterial infection, a much more difficult and hazardous field, of course, it is a big thing, because this is the most serious complication that awaits these individuals.

DR. M. J. SHAPIRO, Minneapolis: I have been greatly stimulated by the work of Drs. Gross, Eppinger and Burwell. I have had nineteen patients with patent ductus arteriosus since 1922. The main reasons for doing this operation are, first, to hope to prevent subacute bacterial endarteritis and, second, to prevent congestive heart failure. I did not say in my paper that subacute bacterial endo-arteritis and congestive failure are rare, but I said that the statistical evidence in the literature is not clear as to how often these complications occur. The figure of 25 per cent or 40 per cent of subacute bacterial endocarditis in patent ductus arteriosus is based almost entirely on pathologic studies. I believe that most of these cases that were studied pathologically were unusual. I know from postmortem examinations that, when the ordinary postmortem examination is done, the ductus arteriosus is missed. I believe that patency of the ductus must be more common than is appreciated. There have been some very unsatisfactory results with this operation. Dr. Gross deserves the utmost praise for his achievement, yet there have been other excellent surgeons who have attempted this operation and have failed. Of my nineteen patients only one or two were maldeveloped. I have been impressed with the unusually good physical condition in this group. In regard to the question of subacute bacterial endarteritis, we know that one of Dr. Jones's patients died about forty-five days after the operation of subacute bacterial endarteritis which developed at the point of ligation. Interestingly enough there was recanalization of the duct. I believe some of the patients who have been operated on are not any different from the group of patients I have followed, some of them as long as seventeen years, and who showed no evidence of cardiac failure. Not one of my nineteen patients has developed subacute bacterial endarteritis, and only one patient died after surgery. I believe that surgical operation should remain for those patients who give evidence of enlargement of the heart. These patients should not be operated on when they are young unless one can prove by observation that the vessels in the lungs are getting larger, the heart is increasing in size and there is some evidence of congestive failure. In regard to operating on patients with subacute bacterial endarteritis, I should be in favor of operating on every one of them because at the present time we have nothing to lose.

DR. HAROLD E. B. PARDEE, New York: I have not had great personal experience with cases of congenital heart disease. I have felt as Dr. Stroud does that it has been a comparatively uninteresting subject from the point of view of treatment. I feel, however, that this surgical procedure marks a tremendous advance and warrants considerable discussion. It has great promise and with further development the present operative mortality will be greatly reduced. I do not believe that we know what the operative mortality is at present. I do know that of two reported series totaling thirty cases there have been two deaths, which is a mortality of about 7 per cent. We have heard at this meeting of a couple of other cases in which death occurred and which have not been reported, so that I believe that in the hands of the general surgeon not yet familiar with the operation the mortality is much higher than 7 per cent. Situations must arise during the operation which I am sure Dr. Gross will be able to tell us about, which make it extremely difficult in certain cases to perform the operation successfully. I am convinced that Dr. Stroud and the last discussor are correct that the importance of bacterial endocarditis as a complication has been overemphasized. This is almost of necessity so, because the most statistics are collected from the literature of reported cases. There is a glamor connected with bacterial endocarditis which would lead a physician having such a case to report it. The same patient dying of heart failure would not attract the same attention. We do not even know that this operation will

prevent the subsequent development of bacterial endarteritis on the site of the orifice of the patent ductus which has been obliterated, because the surface of the aorta at this point may be congenitally structurally defective and so still may acquire the infection later in life. I am not sure that nineteen years is long enough to follow these cases. I think it ought to be thirty-nine. I feel that at present the operative indication should include only cases which show evidence of cardiac insufficiency—that is, limitation of ability to exercise—cases that show considerable cardiac enlargement, especially those with progressive enlargement under observation and cases that show nutritional deficiency. If we operate for one of these three reasons, we have a sound reason for the operation because without it the patients will progressively grow worse. I should not operate on a patient who is apparently doing well, who is well nourished, who does not show signs of cardiac insufficiency and who does not have much cardiac enlargement.

DR. WILLIAM J. KERR, San Francisco: This operative procedure has opened up a new era in the study and treatment of heart disease. I wish to record an experience which I have had in two cases with operative procedures and to suggest that perhaps others will be found in the same category. The first patient was a woman in her twenties who was beginning to show signs of congestive failure with irregularities in rhythm. She had all the symptoms and signs of patent ductus arteriosus and probably had no other complications in the heart. At the time of operation, performed by Dr. Harold Brunn of San Francisco, it was rather difficult to find the patent ductus. Something was found which on having a ligature placed about it seemed to shut off the murmur and cause a change in the peripheral blood pressure readings at the time. The patient during the next several hours developed symptoms of severe infection, and *Staphylococcus aureus haemolyticus* was present in the fluid removed from the wound. The patient lived for two days. At autopsy it was found that there was no patent ductus arteriosus, but a fistulous opening connected the lumen of the arch of the aorta and the left branch of the pulmonary artery, the opening being 7 mm. in diameter, and it would not have been possible, excepting under procedures mentioned by Dr. Beck, I believe, to have separated the vessels and suture them. In connection with this case, which may be similar to one reported by Dr. Gross in which *Staphylococcus aureus* also was found, the question came up in my mind whether the staphylococcus came from the patient or from the audience; those who were inlookers at the time of this procedure may have brought the organisms to the patient. The other patient was a child who, following the operation, which was not difficult, continued to have a murmur although the peripheral signs and symptoms cleared up and apparently the child is in good condition. It brings up a problem which has been repeatedly raised and thought of by most of us. There may be multiple lesions. There may be some narrowing of the pulmonary artery or the pulmonary valve or an opening in the septum in these patients; but if it is adequate to carry on circulation, the patient certainly would be much improved.

DR. ARTHUR E. STRAUSS, St. Louis: There are two factors worthy of more emphasis. First, the factor of the type of bacterial endocarditis which we usually see in patent ductus arteriosus. We know from autopsy material—and it is confirmed by the experimental work on infectious endocarditis—that the site of the bacterial infection is usually the site of trauma, and the bacterial endocarditis in patent ductus arteriosus is usually originally located in the pulmonary artery opposite the inlet of the ductus. If that is the case and if these other infections of the valve are secondary, it seems at least reasonably possible that such bacterial endocarditis may be avoided if the constant trauma of this forcible aortic stream can be stopped by ligation. The other point has already been referred to twice, but from the clinical point of view it cannot be emphasized too strongly; that is, that the diagnosis of patent ductus arteriosus, while from the discussion seemingly simple, is not always so, and we cannot be sure in a great proportion of the cases that there are not other accompanying congenital anomalies.

DR. ROBERT E. GROSS, Boston: It is timely and valuable to have the study which Dr. Shapiro has presented. When com-

bined with the recently published data summarized by Dr. Bullock of Los Angeles, we are now beginning to have a better idea of the prognosis in cases of patent ductus arteriosus. Dr. Shapiro has probably painted a too optimistic picture for the individuals who are left untreated. I know of a family with three children, each of whom has a patent ductus arteriosus. One died in early life, one now has subacute bacterial endocarditis and the oldest has ventricular fibrillation—making this a decidedly important lesion as far as this family is concerned. Many other cases could be cited to emphasize that the patent ductus is not always a harmless lesion. The World War veteran mentioned by Dr. Stroud raises a point regarding criteria for operation. I have an impression that an individual who reaches the age of 35 or 40 years without history or evidence of cardiac embarrassment or endocarditis is not likely to develop these at a later date. Hence operation should not be done after the third decade to prevent some theoretical future disability and should be done only if there are some very definite indications. Regarding the possibility of other cardiovascular abnormalities being associated with a patent ductus arteriosus, it is true that the loud murmur may overshadow the signs of other defects. However, in only one of our cases was there an associated abnormality, and in this instance the ductus was not acting as a compensatory mechanism. A word of caution is in order. The discussers have mentioned some of the pitfalls which may be encountered during or after these surgical procedures and it is obvious that this operation should not be performed without considerable deliberation. Furthermore, a surgeon who is not willing to study various forms of congenital heart disease, who does not familiarize himself with abnormalities which he may encounter in the operative field, who does not thoroughly learn the local anatomy and who does not practice the procedure on cadavers and animals should not risk the life of a patient by embarking on this undertaking, which may lead either to beneficial results or to a disastrous ending.

DR. C. SIDNEY BURWELL, Boston: You may think that this discussion has gotten away from the field of radiology, but I assure you it is not so. Many of the points brought up are concerned either with the diagnosis of patent ductus arteriosus or with the estimation of the severity of the disturbance of circulation associated with it. Judgment on both is much aided by the appropriate use of the radiologic evidence. The situation is something like this: A certain number of patients with patent ductus arteriosus die of subacute bacterial endarteritis. In general, these patients would not have this disease in the absence of patency of the ductus. There is therefore some reasonable ground for the hope that if the ligation of the ductus actually leads to a restoration of the integrity of the local structure the incidence of subacute bacterial endarteritis may be reduced. Only the passage of time and the observation of many patients will answer this question. Patients with patent ductus arteriosus take not only the risk of subacute bacterial endarteritis but also, although we do not know how frequently, the danger of heart failure or of long continued mild cardiac disability. The ingenious and successful operation devised by Dr. Gross has had one far reaching effect that no one has mentioned: it has stimulated enormously the interest in studying the problems of patent ductus arteriosus and of congenital heart disease in general. Two or three speakers have suggested today that there is a possibility that ligation of the ductus may be inadvisable in certain cases because such ligation may interfere with a compensatory function of the ductus. That is, it is suggested that the ductus arteriosus may in some cases play a useful role and permit the passage of blood essential for life. When the patent ductus is playing a useful role the lesions are such that the patient is cyanotic. Therefore, in the absence of cyanosis one need not be concerned lest ligation of the ductus abolish a useful function. Two final points: First, to emphasize again the originality displayed by Dr. Gross in his contribution. It has not only meant a lot to the lives of his patients but is going to mean a great deal to the knowledge of heart disease. Second, to thank the Section on Radiology for giving an opportunity to a group of men and women interested in heart disease to discuss these problems of such interest to themselves in this pleasant and instructive environment.

PREGNANDIOL EXCRETION FOLLOWING
BILATERAL OOPHORECTOMY IN
EARLY PREGNANCY

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AND

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BALTIMORE

Browne and Venning¹ first suggested that the excretion of pregnandiol could be used as a measure of progesterone production and therefore of corpus luteum function. Because the pregnandiol excretion increased markedly during pregnancy and disappeared completely at parturition, it was suggested that progesterone might be produced by the placenta after the second month of pregnancy. Browne and Venning¹ and Jones and Weil² have reported cases in which the corpus luteum of pregnancy was removed on the one hundred and twentieth and the fifty-fourth days, respectively, and the pregnandiol excretion subsequently remained within normal limits. These cases seem to lend additional support to the theory of a placental origin for progesterone during pregnancy. However, in both cases functional ovarian tissue remained.

It has recently been possible to study the pregnandiol excretion throughout pregnancy of a woman from whom all ovarian tissue was removed on the sixty-third day of gestation. Clinically this patient presented no abnormalities during pregnancy and parturition but the pregnandiol excretion never rose above the level usually found during the first ninety days; e. g., values comparable to those found during the luteal phase of nonpregnant cyclic women. Cyonin,³ chorionic gonadotropic, assays were within the range of those found in normal pregnancies. These data are presented in the accompanying chart together with pregnandiol determinations performed in this laboratory on normal pregnant women for purposes of comparison.

METHODS

The pregnandiol determinations were performed by the technic of Venning,⁴ with several minor modifications designed to eliminate errors arising from the spontaneous hydrolysis of the pregnandiol complex to free pregnandiol. Collections were made into bottles containing 200 cc. of normal butyl alcohol each, the bottle being shaken well after the addition of each voided amount. Since hydrolysis of the glucuronide is negligible in butyl alcohol, most of the pregnandiol remains in the combined form. Any free pregnandiol which may have appeared during collection and extraction was recovered from the acetone solutions by a method described by Weil⁵ and by Geschickter and Bucher.⁶ The amount of free pregnandiol was then added to the calculated amount obtained in the combined form to give the total pregnandiol.

From the Departments of Gynecology and Obstetrics, Johns Hopkins University and Hospital.

1. Browne, J. L. S.; Henry, J. S., and Venning, Eleanor H.: The Corpus Luteum Hormone in Pregnancy, *J. Clin. Investigation* **16**: 678 (July) 1937.

2. Jones, H. W., and Weil, P. G.: The Corpus Luteum Hormone in Early Pregnancy, *J. A. M. A.* **111**: 519 (Aug. 6) 1938.

3. Term proposed for gonadotropic hormone of placental origin by E. B. Astwood and R. O. Greep (*Science* **89**: 81 [Jan. 27] 1939).

4. Venning, Eleanor H.: A Gravimetric Method for the Determination of Pregnanediol Sodium Glucuronide, *J. Biol. Chem.* **119**: 473 (July) 1937.

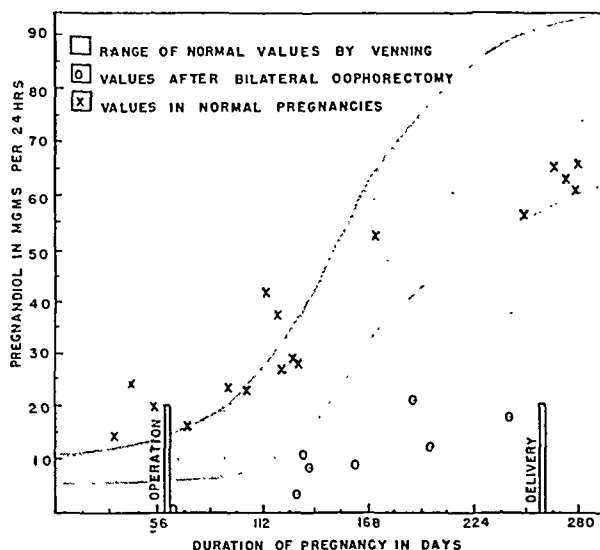
5. Weil, P. G.: Personal communication to the authors.

6. Geschickter, C. F., and Bucher, N. L. R.: *Endocrinology*, to be published.

Assays of chorionic gonadotropin were performed on serum and urine by a method to be published.⁷

REPORT OF CASE

M. W., a Negro woman aged 26 who had had four full term spontaneous deliveries, was admitted to the hospital Sept. 12, 1939. Her past history was negative except that on May 29, 1939, she had had a left salpingo-oophorectomy performed because of chronic salpingitis and a cystic ovary. On admission she complained of slight intermittent vaginal bleeding during the preceding two weeks and severe pain in the lower part of the abdomen of two days' duration. Her menstrual history revealed that she had had only one menstrual period since her operation in May, the date of that period being July 2. Vaginal examination showed the cervix to be softened, the uterus somewhat enlarged and a tender cystic mass in the right fornix. A tentative diagnosis of ectopic pregnancy was made and an exploratory laparotomy was performed immediately, September 13. At operation the mass was found to be an ovarian cyst, and a right salpingo-oophorectomy was carried out. The uterus was noted to be enlarged and softened, giving the appearance of a uterus of early pregnancy. A Friedman test, performed on the day of operation, was reported to be negative. A twenty-



A comparison of the pregnandiol values in milligrams per twenty-four hours in a case of pregnancy in which no ovarian tissue was present and values obtained on normal pregnancies during the same period. The normal range for pregnandiol during pregnancy, as obtained by Venning,¹¹ is also shown.

four hour specimen of urine, collected September 14, sixty-three days after her last menstrual period, showed no pregnandiol. The patient made an uneventful recovery and left the hospital September 24.

She returned to the dispensary November 1, at which time the uterus was found to be the size of a sixteen weeks pregnancy and the fetal heart was audible. She was admitted to the ward for study on November 11. A quantitative assay of serum gonadotropin showed 12,700 international units per liter and the urinary gonadotropin assay was read at 5,400 international units per liter. The twenty-four hour pregnandiol values at this time, on her 132d day of gestation, showed 3.4 mg. November 12, 11.8 mg. November 13 and 9.6 mg. November 14.

The remainder of the patient's antepartum course was normal in every respect, her only complaints being occasional hot flushes and slight abdominal pain. Blood pressure readings remained at about 124 systolic and 70 diastolic throughout her entire pregnancy. She had no vomiting, edema, headaches or visual disturbances. Her urine showed no albumin, casts or red blood cells. Pregnanediol determinations made at monthly intervals showed 8.6 mg. December 10, the 161st day of gestation,

7. Delfs, Eleanor, to be published.

21.3 mg. Jan. 9, 1940, the 191st day, 12.6 mg. January 17, the 199th day, and 18.4 mg. February 22, the 244th day.

A serum gonadotropin assay taken on March 6, 1940, showed 8,100 international units per liter.

Labor occurred spontaneously on March 26, fourteen days before the expected date of confinement. A normal female child was delivered by breech extraction and has since done well. The placenta delivered without difficulty. Grossly it was not remarkable. The weight was 515 Gm. and the dimensions were 18 by 18 by 2 cm. There were several subchorionic infarcts; the maternal surface was normal.

COMMENT

Strong support is lent to the theory that the corpus luteum hormone has an extra-ovarian source during the last two thirds of gestation by the fact that the patient continued to excrete pregnandiol in the urine during the last seven months of pregnancy following the removal of all ovarian tissue. The placenta seems to be the most probable source of the pregnandiol, although a different origin might be argued under these circumstances, as Beall and Reichstein⁸ have isolated progesterone and allopregnanolone from adrenal extracts. Venning, Weil and Browne⁹ have reported the presence of pregnandiol in the urine of two patients with an adrenogenital syndrome neither of whom had corpora lutea; Engel¹⁰ has recovered small amounts of pregnandiol from large volumes of male urine.

The significance of the unusually low levels of pregnandiol cannot at present be evaluated. It is improbable that the determinations entailed a loss of the substance for, as shown in the chart, results in normal cases obtained at the same time approximate those given by Venning¹¹ for normal pregnancies. The presence of some obscure abnormality of the liver or kidney function of this patient which might interfere with the conjugatory or excretory mechanism of the pregnandiol complex is a possibility which must be considered. At present it is possible only to state that there were no demonstrable abnormalities in these systems. The placenta was of normal size and was producing normal amounts of chorionic gonadotropin.

Several theoretical possibilities remain. The first of these is that the ovary may be the main source of progesterone throughout pregnancy, the placenta producing only small supplementary amounts. This has generally been thought unlikely, on the basis of histologic evidence, as the regression of the corpus luteum, as judged by the microscopic appearance, begins at about the third month of pregnancy; that is, at a time when the pregnandiol level is beginning to rise. It cannot be denied, however, that a recognizable corpus luteum may persist throughout gestation.

A second possibility, for which there is no evidence at present, is that the ovary, although not the source, is at least concerned in the metabolism of progesterone during late pregnancy. Lastly, when a sufficient number of cases have been studied it may be found that the values obtained are not beyond the range of uncomplicated gestation. Browne¹² has found several cases with

levels ranging from 10 to 15 mg. of pregnandiol at about the 130th day of gestation and feels that, although the values presented here are certainly low for normal pregnancy, they are not impossible.

In the case presented all ovarian tissue was removed on the sixty-third day of pregnancy. Clinically no abnormalities were observed during pregnancy or parturition. The excretion of pregnandiol, however, remained far below that found in a normal pregnancy; on only two occasions did it even slightly exceed values found in nonpregnant cyclic women. Cyonin, chorionic gonadotropin, determinations on blood and urine gave values comparable to those found in normal pregnancies.

DERRIS ROOT DERMATITIS

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AND

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Derris root or its extractives have been available in the United States for many years. In September 1911 the McDougalls applied for the first United States patent for its use as an ingredient for animal washes, insecticides and vermifuges.¹ The first reference to this root as an allergen was made by Westen² in 1937, when he reported improvement in two cases of bronchial asthma from exclusion of this substance from the environment. The sole reference revealed by a careful survey of the literature to derris as a cause of dermatitis was that of Racouchot³ in 1939. Haag⁴ states that he has on several occasions had inquiries about workers with derris who had contracted cutaneous lesions, but in none of these was the specific nature of the eruption given. From the information he received he was unable to ascertain the exact nature of the eruption.

REPORT OF CASE

F. K., a white man aged 27, married, was referred to one of us (M. D.) by Dr. D. R. McLean Dec. 12, 1939. For the past eight years he had worked as a florist's helper spraying insecticides on plants, cutting and bunching flowers and potting plants. He handled about forty different varieties of plants including chrysanthemums, pom-poms, lilies, hyacinths and tulips. November 20 he cut the palm of his right hand with a piece of glass. He applied iodine and covered the cut with adhesive tape. November 21 there developed an intense itching involving the legs, thighs, arms, forearms and genitals. There was some redness present in these regions but no other visible cutaneous lesions. He did nothing for the condition. He had been spraying flowers and plants for several days previously, and during the process his clothes became soaked with the spray. November 23 the penis began to swell. He went to a drug store, where the clerk sold him a bottle of a proprietary lotion, which he applied to his entire body and which soothed the skin. He also took some sodium bicarbonate baths. The following day he had a recurrence of the intense itching and he consulted a physician, who gave him a lotion (calamine). The itching was temporarily relieved by the application of the lotion and an ice bag. November 28 the itching was again very intense and the genitals became greatly swollen. He was hospitalized by the physician for five days, during which period the itching was greatly relieved. When first seen by one of us the patient stated that the itching was intermittent, occurring at irregular intervals during the day and night. It was also ascertained that five years previously he had a primrose dermatitis. The

8. Beall, D., and Reichstein, T.: Isolation of Progesterone and Allopregnanolone from Adrenal, *Nature* **142**: 479 (Sept. 10) 1938.

9. Venning, Eleanor H.; Weil, P. G., and Browne, J. L. S.: Excretion of Sodium Pregnanediol Glucuronide in the Adrenogenital Syndrome, *Proceedings of the 33d annual meeting of the American Society of Biological Chemists*, April 26-29, 1939.

10. Engel, L. L.; Thorn, G. W., and Lewis, R. A.: The Urinary Excretion of Steroid Compounds: I. Normal Male Subjects, *Proc. Am. Physiol. Soc.* 1940, p. 56.

11. Venning, Eleanor H.: Further Studies on the Estimation of Small Amounts of Sodium Pregnanediol Glucuronide in Urine, *J. Biol. Chem.* **126**: 595 (Dec.) 1938.

12. Browne, J. L. S.: Personal communication to the authors.

1. Roark, R. C.: Abstracts of Foreign and Domestic Patents Relating to Derris, Lonchocarpus, Tephrosia, and Rutenone, *Bulletin E-446*, U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, 1938, p. 21.

2. Westen, C. G.: *J. Allergy* **9**: 62 (Nov.) 1937.

3. Racouchot, Jean: *Arch. d. mal. profess.* **2**: 149 (March) 1939.

4. Haag, H. B.: Personal communication to the authors.

patient's family history for allergy was negative. He stated that he had never had any other disease of the skin.

Examination December 12 revealed a number of discrete follicular papules and pustules on the thighs, legs and popliteal spaces and over the sacrum. There was a patch of erythema in each cubital fossa. There was marked dermatographism. These features suggested the possible allergic nature of the dermatitis. The history suggested insecticides as the possible cause. To identify the cause, further study was undertaken.

Patch tests were performed with the substances which the patient handled.

After forty-eight hours the patches were removed and revealed no reactions. Subsequently, allergic investigation was undertaken (T. B. F.) and tests to derris and pyrethrum by the scratch technic gave negative results. Intracutaneous tests elicited a marked reaction to a 1:1,000 solution of derris extract. Passive transfer tests were performed, and circulating antibodies were demonstrated in three different subjects who gave no reaction in their control sites.

On complete avoidance of contact with insecticides containing derris, the patient has made an uneventful recovery and has remained free from symptoms although working at his occupation to date (March 1940).

HISTORICAL SURVEY

The roots, bark and shrubs of the *Lonchocarpus* family originally came from the Malay Peninsula but are now cultivated in large amounts in Brazil and Peru. This family of plants has served the natives of the Malay Islands and those of the Amazon region since

Results of Patch Tests with Substances Handled by the Patient

		24 Hrs.	48 Hrs.
1. Hitox	1: 600 in water	0	0
2. Loro	1: 600 in water	0	0
3. Multicide	1: 600 in water	0	0
4. Derrisol	1: 600 in water	0	0
5. Chrysanthemum, leaf and petal.....		0	0
6. Pom-pom, leaf and petal.....		0	0

Substances 1 to 4 are insecticides. Their ingredients are as follows:

Hitox: rotenone, pyrethrum, vegetable oil.

Loro: aliphatic thiocyanates, principally lanryl, 50%; thiocyanate sulfur, 5.75%; aliphatic sulfonates, 40% (combined sulfur 0.4%); inert ingredients 10%.

Multicide: water, 14%; pyrethrum extractive, 18%.

Derrisol: derris resin, 5%; fatty acids, 50%; inert matter, 45%.

ancient times. The natives apparently knew of its lethal powers for a much longer period than that of curare and used it to make a poison for arrows. The animals struck would die in a few minutes, but their flesh would remain edible because practically none of the poison is assimilated by the digestive tract. The natives have also used this poisonous root to catch fish. The poison is a fish toxin of almost unbelievable power—a dilution up to 300,000 serves to anesthetize and kill a quantity of large fish in a few minutes. The fact is more surprising since the ichthyotoxic principle of derris is only slightly soluble in water.

The farmers of China, Java and Ceylon were apparently the first to recognize the remarkable insecticidal properties of the rotenone-containing plants and use the poison extensively in their horticulture. The use of these insecticidal plants in modern agriculture has spread rapidly because they are not as toxic to man or animals as are the insecticides containing arsenic, lead and copper.

BOTANY

Roark⁵ deals fully with the botany of derris and allied plants in his monograph on *Lonchocarpus*, which

is a genus of tropical shrubs comprising some sixty species. However, only four known species and three suspected species have insecticidal properties. The two most commonly employed commercially are cubé root (*Lonchocarpus nicou*) and derris root (*Derris elliptica*).

TOXICOLOGY

Studies have been reported by Ambrose and Haag⁶ on the chronic toxicity of derris (*Derris elliptica*) for rabbits, dogs and rats. Rabbits given 60 mg. per kilogram and more showed signs of cumulative toxicity. In adult dogs on a diet containing 0.04 per cent of derris, no symptoms of toxicity were observed. In young growing dogs on the same diet, the most pronounced effect was the stunting of growth. Diets containing less than 0.0312 per cent of derris had no demonstrable effect on the growth of rats. As the concentration of derris in the diet was increased, the inhibition in growth was more marked. Pathologic studies of the tissues of dogs and rats indicated that derris, in all concentrations studied, was somewhat injurious, the liver being the only organ consistently affected.

Haag⁷ was so convinced of the harmlessness of rotenone that he took 150 mg. by mouth without experiencing any harmful effects.

SOURCES OF CONTACT

In view of the fact that the plants of the derris family are now being cultivated in the American countries and because of their superior insecticidal properties and apparent absence of toxicity when ingested by human beings, they are rapidly replacing the arsenical and mercurial insecticides. A number of insecticides, animal washes and vermifuges containing derris root or its extractives are now available in the American markets.

COMMENT

Racouchot³ reported a series of cases of dermatitis occurring in workers who ground the dry derris root into a powder which was used as an insecticide. The workers handling the powder presented in two or three days a violent dermatitis of the genital region. The scrotum became reddish violet and markedly edematous, and the natural folds became exaggerated. The skin of the penis and prepuce was erythematous and cut with shallow fissures. The pruritus was intense. After forty-eight hours, when contact with the powder was avoided, the irritated skin desquamated in large and small plaques, and all conditions returned to normal. If the noxious contact was continued, the dermatitis became aggravated but did not extend farther than the genitocrural fold. The pruritus was intensified and the erythema increased. The skin was covered with large, flat papules *en pastille* about 0.5 cm. in diameter, excoriated and weeping. The prepuce was edematous and weeping. The dermatitis returned with each new exposure. All the cutaneous reactions (patch tests?) were negative and the skin of the genital region alone was affected. He thought this was due to the fineness of the skin and to the constant humidity and oiliness of this location. The active principles of cubé are, in fact, much more soluble in oily mediums than in water. He instituted prophylaxis in the grindery with excellent

6. Ambrose, A. M., and Haag, H. B.: *Indust. & Engin. Chem.* **30**: 592 (May) 1938.

5. Roark, R. C.: *Bulletin E-367*, U. S. Department of Agriculture, Bureau of Entomology and Plant Quarantine, 1936.

7. Haag, H. B.: *J. Pharmacol. & Exper. Therap.* **43**: 193 (Sept.) 1931.

results. A closed ventilating system was installed and the grinders were modernized. Each worker received a gas mask of the small type to cover the mouth and nose. This type of mask is sufficient because the derris dust apparently did not cause conjunctivitis. He placed in each mask a moistened marine sponge about 2 cm. thick, which served very well to stop the powder. Other symptoms that he noted were irritation of the mucosa and an ulcerative, scabby rhinitis with a transient but complete anosmia. In a few instances it irritated the lips like a pigment, as well as the tongue, and produced in it anesthesia followed by a very disagreeable and severe pain. With the mask these sense organs recovered their functions. There has not been a single case of laryngeal or pulmonary complication. A guinea pig has lived for six months in the pure powder at the site of the grinders without being made ill. Each worker is furnished with a special closure for his fly and about the ankles. With these precautions and with the proper body care, he observed no further accidents.

Our patient when seen presented a residual dermatitis but gave a history of a symptom complex involving chiefly the genitalia analogous to that described by Racouchot.

We feel that our case is not a contact dermatitis, but rather a true allergic dermatitis. It is our interpretation that the cases described by Racouchot are of the same type, since the workers were able to resume their regular occupation without recurrences when protected by gas masks and working in modernized and properly ventilated rooms.

SUMMARY AND CONCLUSIONS

1. A case of dermatitis was due either to the inhalation of an insecticide containing derris extractives or to absorption through lacerated skin.
2. There are various sources of possible contact with derris, a plant of the Lonchocarpus family.
3. It was shown that this substance is not a primary cutaneous irritant in the dilutions ordinarily employed.
4. It was shown by negative patch tests that this substance is not a contact irritant.
5. This substance produces dermatitis by a true antigen-antibody reaction, as indicated by positive intracutaneous tests and by positive passive transfer reaction.
6. Avoidance of exposure appears to be the method of prevention for sensitive individuals.
7. Dermatitis is apparently rare in spite of the widespread use of derris.

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Disease and Illness.—Disease is only one element of illness and is not the only cause of disturbances of the activities and functions of the body. There is in fact no fixed relationship between disease and illness. Disease does not necessarily cause illness, and illness may exist without disease. Free and efficient living is dependent on the conditions under which a person lives as well as on his physical state. Just as an automobile may run perfectly along a smooth and level road but give out unexpectedly on a hill, so illness may be precipitated by the burden an individual is forced to carry, placed on him by the conditions of his work, by the people who surround him or by the circumstances of his existence. Illness results from disturbed bodily functions, and its character, duration and severity are dependent not alone on the physical causes of these disturbances but also on the characteristics of the patient as an individual and on the total situation of which he is the center.—Robinson, G. Canby: *The Patient as a Person*, New York, Commonwealth Fund, 1939.

Clinical Notes, Suggestions and New Instruments

SUBACUTE STREPTOCOCCUS VIRIDANS ENDARTERITIS COMPLICATING PATENT DUCTUS ARTERIOSUS RECOVERY FOLLOWING SURGICAL TREATMENT

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NEW YORK

The two serious complications of patent ductus arteriosus that occur most commonly are (1) cardiac failure due to the alteration of circulatory dynamics and (2) subacute bacterial endarteritis resulting from implantation of organisms at the site of the congenital abnormality. Gross,¹ in an attempt to correct circulatory abnormality and in the hope of preventing the future development of subacute bacterial endarteritis, was the first successfully to ligate a patent ductus. Since the report of this case in February 1939, Gross and Hubbard² have recorded eight additional operative cases and Bullock, Jones and Dolley³ a series of eleven. The results in these twenty cases have demonstrated conclusively that ligation of the patent ductus is effective in correcting circulatory abnormality.

Up to the present, subacute bacterial endarteritis complicating patent ductus has been treated by medical methods identical with those employed in cases of subacute bacterial endocarditis. It may be stated that such treatment in general has been unsuccessful. In May 1938, Graybiel, Strieder and Boyer⁴ reported a case in which an attempt at cure was made by surgery. Because of technical difficulties, their plan of ligating the patent ductus could not be carried out and the structure was pliated by external sutures in an effort to obliterate the lumen. The patient died on the fourth postoperative day of acute gastric dilatation, and at postmortem examination the ductus was found to have been incompletely occluded. Aside from this report we have found no record of any attempt at cure of the infection by surgical methods. Our purpose in this communication is to report a case of patent ductus arteriosus complicated by subacute Streptococcus viridans endarteritis in which recovery apparently has followed operation. To the best of our knowledge, this is the first such case to be recorded in the literature.

REPORT OF CASE

History.—S. S., a native born white woman aged 29, single and an office worker, was admitted to the medical service of Beth Israel Hospital, Jan. 20, 1940. The patient was one of five siblings, none of whom suffered from any known congenital anomaly. She had been told that a cardiac murmur had been present since birth but that she had not been a "blue baby." During her childhood, although she was warned against engaging in strenuous games, she skated, swam and played ball. She was able to do these things without manifesting unusual distress or shortness of breath. At the age of 8 she underwent a tonsillectomy. At the age of 14 she suffered a mild attack of typhoid. Since then she had been quite well until the onset of the present illness.

About two and one-half months prior to admission to the hospital she became nervous, irritable and easily fatigued. These symptoms were progressive and she soon lost her appetite and she began to vomit and to lose weight. Although she did not take her temperature, she "felt warm" and perspired freely on a number of occasions. Two weeks before admission a non-productive cough developed. One week later, and again on the day of admission, she had a chill. During the illness, the weight fell from 95 to 88 pounds (43 to 40 Kg.).

From the Medical Service of Dr. Albert A. Epstein and the Surgical Service of Beth Israel Hospital.

1. Gross, R. E., and Hubbard, J. P.: *Surgical Ligation of a Patent Ductus Arteriosus*, J. A. M. A. 112: 729 (Feb. 25) 1939.
2. Gross, R. E., and Hubbard, J. P.: *The Criteria for Ligation of the Patent Ductus Arteriosus*, lecture before the Section of Pediatrics, New York Academy of Medicine, Jan. 11, 1940.
3. Bullock, L. T.; Jones, J. C., and Dolley, F. S.: *The Diagnosis and Effects of Ligation of the Patent Ductus Arteriosus*, J. Pediat. 115: 786 (Dec.) 1939.
4. Graybiel, Ashton; Strieder, J. W., and Boyer, N. H.: *An Attempt to Obliterate the Patent Ductus Arteriosus in a Patient with Subacute Bacterial Endarteritis*, Am. Heart J. 15: 621 (May) 1938.

Examination.—The patient was pale, thin and underdeveloped. She was acutely ill. The temperature was 103.4 F., pulse rate 144 and respiratory rate 18. There was no dyspnea or cyanosis. No petechiae were present in the fundi or conjunctivas nor on the body or extremities. The pharynx was not injected, the teeth were in good repair and cervical lymph glands were not palpable. The main features of interest were found on examination of the heart. The latter was not enlarged. The point of maximal apical impulse was situated in the fifth interspace in the midclavicular line. A short, blowing systolic murmur was heard over the apex and over most of the left precordium. In the second interspace, immediately to the left of the sternum, a moderately loud machinery-like murmur replaced the first sound. This murmur continued through the second sound and apparently through most of diastole. It also could be heard in the first and third left interspaces, immediately outside the apex and between the mesial border of the left scapula and the vertebral column. The pulmonic second sound was accentuated. Over the aortic area the sounds were normal. There was no evidence of cardiac failure.

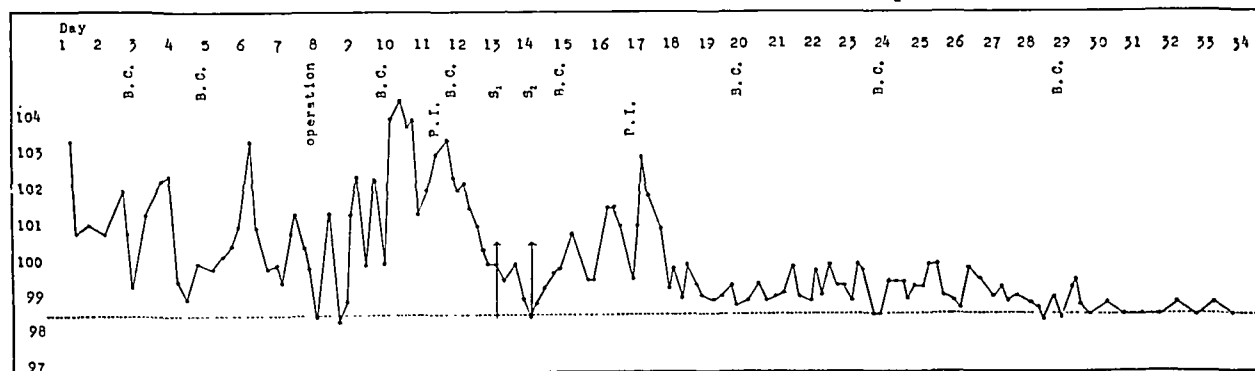
The lungs were clear; the spleen was barely palpable. There was no clubbing of the fingers. The blood pressure was 98 systolic, 60 diastolic, and on the five succeeding days 94/66, 110/66, 110/72, 110/70 and 108/68.

Laboratory Data.—A teleroentgenogram revealed the heart to be of normal size but somewhat oval. There was some prominence of the arc of the pulmonary artery and left auricle,

unsuccessful. Accordingly, surgical therapy was considered and seemed warranted for various reasons. It was postulated that if the vegetations were confined to the ductus, excision of the latter might result in recovery. If the vegetations were situated in the ductus, pulmonary artery and right side of the heart, it was hoped that excision or ligation of the ductus would promote healing of the lesions by eliminating the arterio-venous communication and the swirling current of blood. It was further suggested by Dr. Emanuel Libman, who saw the patient in consultation, that the shutting off of the flow of oxygenated blood from the aorta into the pulmonary artery might render conditions less favorable for the growth of vegetations in the pulmonary artery and right side of the heart.

It was realized that operation presented certain dangers such as infection of the pleura and mediastinum, accidental hemorrhage from the friable infected ductus and dislodgment of infected thrombi into the circulation. However, in view of the otherwise almost hopeless prognosis, it appeared warranted to take these risks. With the understanding, on the part of the patient's relatives, that the procedure was experimental, but under the circumstances worthy of trial, operation was undertaken seven days after admission.

Operation.—On Jan. 27, 1940, an operation was performed (by A. S. W. T.) under intratracheal cyclopropane anesthesia. A left-sided anterior thoracic incision was made, from the sternum to the anterior axillary line in the third intercostal space. The second and third costal cartilages were divided



Patient's temperature course in hospital. B. C. indicates blood culture; S1, sulfapyridine; S2, sulfapyridine stopped; P. I., pulmonary infarction.

with straightening of the left cardiac border. Moderate pulmonary vascular congestion was present. Kymographic examination indicated very marked pulsation of the pulmonary artery. The four lead electrocardiogram was normal; left axis deviation was present. A phonocardiogram revealed the murmur over the pulmonic area to be continuous through systole and diastole, except for a short period of silence during pre-systole. The specific gravity of the urine ranged up to 1.020. Albumin and dextrose were absent. An occasional red blood cell was seen in the low power field. The benzidine test was repeatedly negative. No casts were found. The blood contained 3,850,000 red cells per cubic millimeter. Hemoglobin content was 74 per cent. There were 17,500 white cells, of which 69 per cent were polymorphonuclear leukocytes and 31 per cent mononuclear cells. The erythrocyte sedimentation rate was 45 mm. in forty-five minutes. The Wassermann, Kline and Kahn tests gave negative results. A blood culture taken two days after admission revealed 50 colonies of *Streptococcus viridans* per cubic centimeter after twenty-four hours incubation and 400 colonies per cubic centimeter after forty-eight hours. Another blood culture taken two days later yielded heavily positive results in the flasks but plates were not inoculated. The diagnosis of patent ductus arteriosus with complicating subacute *Streptococcus viridans* endarteritis was made.

The patient was observed for seven days, during which time the clinical course was of the septic type, with sweats and irregular fever ranging between 99 and 103.4 F. During this period the only medication administered was acetylsalicylic acid and phenobarbital.

In the past at our institution attempts to cure subacute bacterial endocarditis by means of drugs or hyperthermia had been

and the pleural cavity was entered. By retracting the divided ribs upward and permitting the lung to collapse, an excellent exposure of the aortic arch and the left pulmonary pedicle was obtained. An extensive tremor and thrill were noted over the exposed surface of the heart. The thrill also was palpable over the root of the aorta and the region of the pulmonary artery. Through a directly applied sterile stethoscope a very loud, harsh, whirring murmur could be heard over these areas throughout the cardiac cycle. A 4 cm. incision was made in the mediastinal pleura below the aortic arch, and the under surface of the arch, ductus arteriosus and pulmonary artery were freely exposed. The ductus measured about 14 mm. in length and 10 mm. in diameter; the pulmonary artery was markedly dilated. The thrill and murmur previously described were now detected directly over these two structures. The left recurrent laryngeal nerve was identified as it passed beneath the junction of the ductus and aorta. The ductus next was isolated, except on its deep surface, where it was quite adherent. With some difficulty the deep surface was freed, and a strand of heavy silk on a ligature carrier passed beneath it. As gentle upward traction was made on the untied ligature, vigorous and profuse bleeding suddenly began from the depths. Although the source of the hemorrhage was not visible, it was assumed to be due to a tear in the deep surface of the ductus. In view of the fact that only the gentlest traction had been made, it was further assumed that the wall of the ductus was very friable. With difficulty, bleeding was temporarily controlled by pressure, and clamps were applied to the ductus. The structure then was rapidly dissected free and divided completely. The upper end was ligated with a heavy silk ligature immediately adjacent to the aorta and the lower end similarly ligated adjacent to the

pulmonary artery. Because of assumed contamination of the operative field from the divided ductus, the incision in the mediastinal pleura was not sutured. Immediately before the thoracic closure was completed the lung was expanded with positive pressure.

Concomitant with the severe hemorrhage during operation, the blood pressure and pulse became almost imperceptible and the patient went into shock. After an immediate intravenous infusion of acacia, followed by a transfusion of 500 cc. of citrated blood, improvement was noted, but her condition was still precarious at the end of the operation.

Postoperative Course.—On her return to the ward two transfusions of 500 cc. each were administered within a period of several hours. Within another few hours evidence of shock had disappeared. During the first few days intranasal oxygen was administered at intervals to control transient episodes of dyspnea and cyanosis. Several hundred cubic centimeters of serosanguineous fluid was aspirated from the left side of the chest on the third, fourth and ninth postoperative days. Cultures of these fluids subsequently were reported negative. On the second postoperative day the temperature rose to 104.4 F. but thereafter receded, except for transient rises, to 103.4 F. and 103 F., on the fourth and ninth postoperative days respectively, concomitant with minor episodes of right-sided pulmonary infarction. From the tenth to the eighteenth day after operation, the temperature did not rise above 100 F. From the nineteenth to the twenty-sixth day, when the patient was discharged from the hospital, the temperature gradually returned to normal. The wound healed by primary union, all sutures being removed on the fifth postoperative day. The patient was allowed out of bed on the twelfth day after operation.

Six postoperative blood cultures were taken (on the second, fourth, seventh, twelfth, sixteenth and twenty-first days respectively) and all remained sterile throughout fourteen days of incubation. Some of these blood specimens were arterial as well as venous; some were anaerobic as well as aerobic.

It was planned to withhold chemotherapy following operation in order to observe the effect of surgery alone on the bacteremia. However, because of fear of the development of mediastinal and pleural infection, sulfapyridine was administered on the afternoon of the fifth postoperative day. Six Gm. of the drug was given on that day, and 3 Gm. on the following day, at which time it was discontinued because of persistent vomiting. It is to be noted that when the administration of sulfapyridine was begun the temperature was subsiding and was down to 100 F. and that the two postoperative blood cultures taken up to that time had been reported sterile. It therefore appears highly unlikely that the drug had any significant effect on the bacterial infection. When the patient was discharged from the hospital on the twenty-sixth postoperative day, she was symptom free, had gained 3 pounds (1,360 Gm.) and appeared in good physical condition. At that time she was referred to a convalescent home with instructions to return to the hospital in three weeks.

During a twenty-two day stay in the country, the temperature, taken daily, remained normal; she gained 7 pounds (3,175 Gm.) and felt entirely well. She was readmitted to the hospital forty-eight days after operation for a check-up investigation. During a three day period of observation in the hospital the rectal temperature, taken twice daily, was 98.6 F. on each registration. The blood pressure was 110/70, which was essentially the same as before operation. Of great interest was the persistency of the continuous murmur⁵ over the pulmonic area. Its intensity had diminished somewhat, however, and it was more circumscribed than it had been previously. The spleen no longer was palpable. Slight hoarseness due to partial loss of function of the left vocal cord was present. The urine was normal. No red cells were observed and the benzidine test gave negative results. The blood count was normal. The hemoglobin content was 102 per cent. The sedimentation rate

was 5 mm. in forty-five minutes. A blood culture revealed no growth. The four lead electrocardiogram was identical with the one taken before operation. On the basis of the observations, the assumption that bacterial infection still was absent was warranted. Accordingly, the patient was discharged and permitted to return to work. When last examined on March 30, 1940, exactly nine weeks after operation, she appeared in excellent health.

SUMMARY

A woman aged 29 had patent ductus arteriosus with superimposed subacute *Streptococcus viridans* endarteritis. During a seven day period of hospital observation the clinical course appeared severe. Blood cultures revealed as many as 400 colonies of *Streptococcus viridans* per cubic centimeter. Operation was performed primarily in the hope of eliminating the infection. The procedure consisted of division and double ligation of the ductus. Severe hemorrhage occurred at operation, but the postoperative course otherwise was essentially uneventful. Nine weeks has elapsed since operation.⁶ All postoperative blood cultures, seven in number, have been sterile. This is the first successful ligation of a patent ductus arteriosus complicated by subacute bacterial endarteritis to be reported. It is also the first such case in which recovery from the bacterial infection apparently has resulted.⁷

940 Park Avenue.

Special Clinical Article

THE DRAMA OF TUBERCULOSIS

CLINICAL LECTURE AT NEW YORK SESSION

JAMES ALEXANDER MILLER, M.D.

NEW YORK

THE HUMAN DRAMA

The effect of long drawn out chronic illness on life and character is well known to physicians and has appealed to historians, dramatists and story tellers in many lands, through various tongues and in numerous forms.

Many are the famous personages in various walks of life whose careers have been influenced by personal experience with tuberculosis. To enumerate only a few we may note:

In literature, Schiller, Keats, Byron, Thoreau, Brontë, Elizabeth Barrett Browning, Robert Louis Stevenson and Eugene O'Neill.

In music, Chopin, Paganini, Mozart and von Weber.

In art, Raphael, Molière and Rachel.

In philosophy, Voltaire, St. Francis of Assisi and John Calvin.

Among statesmen, Cicero, Cecil Rhodes and Kerensky.

Among military leaders, Lord Nelson and John Paul Jones.

In science, Descartes, Priestley and Luther Burbank.

In medicine, Laënnec, Ehrlich, Benjamin Rush and Trudeau.

Much has been written of the tuberculous temperament and many have accepted this suggestion as a definite fact with wide implications. Such a specific influence on temperament is extremely doubtful. There

5. As the result of observations made during operation in this case, and subsequently in three similar cases, it appears that in adults suffering from patent ductus arteriosus complicated by subacute bacterial endarteritis the continuous murmur, although originating in part in the patent ductus, is generated principally in the dilated pulmonary artery. The details of the observations on which this statement is based will be published in a future communication.

6. Since this paper was submitted for publication another eleven weeks has elapsed. During the period of twenty weeks since operation, the patient has been kept under close observation and remains in excellent general physical condition and free of all evidence of infection.

7. Three additional cases of patent ductus arteriosus complicated by subacute bacterial endocarditis have come to operation. The results in these cases will be presented in a forthcoming issue of the *Journal of Thoracic Surgery*.

Read in the General Scientific Meetings at the Ninety-First Annual Session of the American Medical Association, New York, June 10, 1940.

can be little doubt that a long struggle with such a serious chronic disease had a profound influence on the character and career of those mentioned as well as of thousands of less favored folk. Success in overcoming such a physical handicap not only demands courage but it develops strength of character and increased confidence to meet the other problems of life.

Even in failure, fate may be conquered by the development of acquiescence and a philosophic calm which gives inspiration to all about one and thus enables the spirit to triumph not only over disease but over death itself.

Interpreted in this sense, tuberculosis has undoubtedly profoundly affected the lives and careers of many to their own betterment and to the great advantage of mankind.

The story of the lives of these and other great men and women is each a stirring drama with a universal appeal.

This has been widely recognized in many works of nonhistorical literature where art has served to dramatize more highly the human elements of struggle, of disappointment, of success or of tragedy. Of these none is more widely known and appreciated than Dumas's romantic play *La Dame aux camélias*, or *Camille*, the story of which has also been dramatized in opera by Puccini in *La Bohème*.

The dramatic appeal of tuberculosis is recognized as a general one, directed to the imagination and sympathies of all but especially to physicians who through the long history of our profession have witnessed the patience, the courage, the tragedy of many grim struggles and often the eventual triumph.

The human side of our professional contacts has enriched our experience, has strengthened our faith in human nature and has developed our spiritual as well as material resources to help others combat this disease.

THE MEDICAL DRAMA

Fascinating as is the human story of this age long disease, it is the story of the gradual development of our knowledge of it that is of especial interest and concern to a gathering of physicians such as this. I therefore will address myself to a brief review of that history. This too is a drama of intense professional as well as human interest.

Such a historical review has the endorsement of Sir William Osler, who once wrote: "By the historical method alone can many problems in medicine be approached profitably. For example, the student who dates his knowledge of tuberculosis from Koch may have a very correct but a very incomplete appreciation of the subject."

EARLY HISTORY

References to tuberculosis are recorded in Persia and Egypt as far back as 2000 B. C. but it is not until the time of Hippocrates, 450 B. C., that any important medical records are available. While Hippocrates made some very keen clinical observations, as in his clear picture of pneumothorax and his emphasis on the value of rest, of a milk diet and of climatic change in the treatment of pulmonary tuberculosis, his theory of its causation was the aspiration of mucus from the brain and he conceived of its pathology as tumors of the lung with a tendency to suppurate.

Hippocratic medicine extended from Greece to Rome, where Galen, 150 A. D., was the dominating figure.

His conception of the disease was that of ulceration rather than tumor formation and he thought that it was caused by the corrosive action of tissue fluids.

Galen's ideas prevailed for 1,600 years. They were preserved and practiced in very crude forms almost exclusively in the monasteries during those long dark ages.

In the seventeenth century came the revival of learning, in which medicine shared. The advance of medical knowledge came primarily from postmortem examinations long proscribed by religious opposition and the first leaders were in Holland, notably Sylvius and Boerhaave, and in England, Willis. Thus was gross pathologic anatomy first established as the fundamental basis of scientific medicine.

In the eighteenth century the possibility of the communicability of tuberculosis was first recognized in Spain and later in Naples, where the first quarantine against the disease was established. In physical diagnosis the first great step was taken in 1761 by Auenbrugger, who introduced percussion as a valuable method in the physical examination of the chest.

In 1790 Baillie in London after careful anatomic studies expressed his belief that tuberculosis and scrofula were the same disease, a fact hitherto disbelieved.

THE NINETEENTH CENTURY

The nineteenth century developed medical knowledge to an extent and at a tempo never before known. The earlier decades were dominated by France. Bayle in 1810 classified pulmonary tuberculosis so as to simplify greatly clinical thought and laid the foundation for the astounding contributions of Laënnec, who in a few brief years coordinated the pathologic and clinical concepts of tuberculosis, crystallized them into one of the great medical classics, *Traité de l'auscultation médiate et des maladies des poumons et du cœur*, published in 1819, which stands today as a work unexcelled for accuracy and clarity of description. Incidentally he invented the stethoscope, for which feat he is perhaps most widely known and then he tragically died at the age of 45 from the very disease which he was the first to understand adequately and to describe.

Following Laënnec, Louis carried on his great French tradition of careful physical examination of the chest and, in Vienna, Skoda added notable contributions in the 1830's.

In 1843 Sir James Clark in England reemphasized climatic treatment especially in the mild environment of Madeira and the Riviera.

It was at this time that pathologic histology first began to be studied because of the development of the microscope.

Virchow in Berlin led the way in these studies, and in 1847 he gave the first accurate histologic description of tuberculous lesions. Master as he was, he still clung to some of the old erroneous theories, for example that tubercle was caused by irritation and that tuberculosis and phthisis were distinct and separate entities. As late as 1866 one of Virchow's students, Niemeyer, uttered the famous dictum "The worst thing that can happen to a case of phthisis is to develop tuberculosis."

The center of progress then shifted back again to France through the remarkable researches of Villemin from 1862 to 1867. The name of this brilliant investigator has been extraordinarily neglected in the history of tuberculosis. By clinical investigation supported by

animal experimentation he strongly opposed the then accepted theory of a diathesis as the cause of the disease and came to the conclusion that it was due to an extraneous agent of a virus nature. He considered tuberculosis comparable to syphilis and glanders and that it was a zymotic disease which was communicable and he proved that this communicability was accentuated by overcrowding. As a result, he suggested measures of prevention by the improvement of environment and by protection from exposure to known sources of infection. Villemin was thus the logical forerunner of Robert Koch and the bacteriologic era.

THE BACTERIOLOGIC ERA

The revolutionary discoveries of Pasteur, begun in 1870, laid the foundations of bacteriology and led to the knowledge of the causation of tuberculosis as well as of many other infectious diseases. Thus was begun the astoundingly rapid development of modern medicine, i. e., within the lifetime of some of us here present. Pasteur himself did not investigate tuberculosis but it was inevitable that his ideas of bacterial infection should have immediately directed attention to tuberculosis because of the suggestive facts already established by the investigations and theories of Villemin. Laboratory studies were prosecuted feverishly under the exciting stimulus of the new knowledge but tuberculosis proved a more difficult problem than some other diseases and it was not until 1882 that Robert Koch announced his proved discovery of the tubercle bacillus as the cause of tuberculosis. It is interesting to note that within a few months of Koch's announcement Baumgarten and a few months later Aufrecht published the fact that they too had recognized the germ of tuberculosis and there can be no doubt that these investigators discovered the tubercle bacillus coincidentally with and independently of Koch. Koch, however, has always been credited with the discovery because of the priority of his publication and also because his announcement was made in a paper which was a masterpiece of scientific description and logical thought.

This paper, entitled *Die Aetiologie der Tuberculose* and published in the *Berliner klinische Wochenschrift* April 10, 1882, is another of the great classics of medical literature. It is to be noted that these discoveries were materially aided by the use of the staining qualities of the aniline dyes developed by the researches of Paul Ehrlich.

The cause being known, naturally thoughts and hopes turned to the discovery of a cure for tuberculosis and by none more energetically than by Koch himself. In 1890 he electrified the world by the discovery of tuberculin, his experiments leading him to the belief that in it might be a specific cure. The excitement was intense. Welch, who was then professor of pathology and bacteriology in New York, sent his promising young assistant Hermann M. Biggs to Berlin and he brought back to America the first supply of "Koch's lymph," as it was then called. Trudeau in his isolated makeshift laboratory at Saranac Lake caught the spirit and began his lifelong clinical and animal experiments with tuberculin. All over the world scientists, physicians and laymen alike were in a highly excited state of eager expectancy that the cure for the greatest cause of disease and death was at hand. Slowly came the disillusionment, and it is a sobering reflection on the dangers of premature optimism that now, fifty years later, in

spite of countless experiments and many collateral additions to our knowledge, a specific cure of tuberculosis still eludes us.

The discovery of tuberculin however had real value, for through it as well as by bacillus inoculations Koch developed our knowledge of the variation in tissue reactions between primary and secondary infections, the so-called Koch phenomenon, and particularly later through its use as a diagnostic test, as developed in 1907 by Pirquet and Calmette.

Toward the end of the century the value of sanatorium treatment for tuberculosis, which was first instituted by Brehmer in 1853 and later by Dettweiler in 1874, became more generally recognized and the first sanatorium in the country was founded by Trudeau at Saranac Lake in 1884.

In 1895 Roentgen's discovery of the x-rays marked the beginnings of what was to become the invaluable diagnostic agents which they are today, and in 1894 Forlanini's early clinical experimentation with artificial pneumothorax, which later revolutionized the treatment of many cases of pulmonary tuberculosis.

THE MODERN ERA

We have thus seen that important beginnings in our present knowledge were made toward the end of the nineteenth century, but the extension of our knowledge and its practical application was rapidly and generally developed only after 1900, so that we may properly designate the last forty years since the turn of the century as the modern era. During this time progress in general medicine and especially in tuberculosis has been breath taking in its rapidity. The astounding details of this part of the story are, however, so well known that it will be profitable to review only briefly the high lights of this period.

Von Behring had just postulated the concept that adult tuberculosis derived its origin from childhood infection and in 1912 Ranke built on this and the pathologic studies of Ghon his philosophical treatise on the pathogenesis of the disease outlining three stages, the primary affect, the dissemination phase and lastly the localization in individual organs, especially the lungs. This laid the basis for the modern concept of the endogenous origin of phthisis.

Early in the century Koch and Theobald Smith entered into their famous controversy concerning the distinctive variation between human and bovine bacilli, in which Smith proved his contention of their essential cultural and biologic differences. From these and other researches developed the program for the control of tuberculosis in cattle and the pasteurization of milk, the success of which has almost eliminated certain forms of tuberculosis in man, notably so-called surgical tuberculosis.

One of the notable achievements of this early twentieth century era was the organization of the anti-tuberculosis campaign of education and prevention. In this country under the scientific and medical leadership of such men as Biggs, Welch, Trudeau, Osler, Flick and Knopf this campaign was crystallized into the National Tuberculosis Association, which organized a combined medical, social and lay crusade which now has units in every community, with the far reaching effects with which we are all familiar.

One of the most important results was the emphasis placed on the institutional segregation of infectious

cases, with the rapid increase of sanatorium and hospital beds to nearly 100,000 in the United States.

As an infectious disease tuberculosis became a chief concern of public health authorities, who, aided and encouraged by nonofficial agencies, developed the sanitary control regulations as we know them today. Biggs was the leader in this field in New York City and later in the state of New York. It was in 1893 that he first enforced compulsory registration of tuberculosis, against the strong opposition of the medical profession of that day.

Early diagnosis was soon discovered to be all important for successful treatment and from the multitude of overrefined methods have emerged the history of exposure and of suspicious symptoms, together with the x-rays as the most important factors in early diagnosis, even superseding the value of physical signs.

In recent years mass examinations of groups of the population supposedly well have proved the great value of combined x-ray and tuberculin surveys for discovering early lesions especially in the young age groups.

Treatment of course was not neglected. The so-called hygienic dietetic regimen as best exemplified in sanatoriums has continued to be the fundamental basis of treatment, and here strict rest during the active stages with carefully regulated exercise during convalescence has proved to be a most important factor. Forced feeding and climate have become relatively less important.

The search for a specific cure has been relentlessly prosecuted both in the laboratory and in the clinical field. Serums and vaccines, special and often fantastic diets and chemotherapy applied by inhalations, by mouth and by intravenous routes have all failed, leaving behind a trail of disappointed hopes, of which the Friedman turtle serum fiasco is perhaps the most lamentable.

Calmette's BCG vaccine is a partial exception to the rule of failure, but even this has not yet proved to be of real value and at best is only a preventive and not a cure. In general it may be said that the recent success of chemotherapy in other fields has stimulated hopes for something similar in tuberculosis, but the time is not yet.

Chest surgery has advanced tremendously. Following on the general use of artificial pneumothorax, surgical methods to improve the results of the treatment of pulmonary tuberculosis have developed pneumolysis in the cutting of pleural adhesions, introduced by Jacobaeus in 1912, later phrenicectomy and especially thoracoplasty, first suggested by Brauer and Friedrich in 1909, and materially advanced to the position of a generally accepted procedure by the work of Sauerbruck and Wilms in 1913. At the present time about 40 per cent of all cases of pulmonary tuberculosis are being treated by some form of collapse therapy.

The combined action of all these measures of prevention and treatment, sanitary control, improvement of social and economic environment, education of the profession and the public, institutional segregation, earlier diagnosis and improved treatment has resulted in an astounding diminution in the incidence and the death rate from tuberculosis.

In 1900 the death rate from this disease in the United States was 202 per hundred thousand and in 1939 this had fallen to 47, or less than one fourth of the 1900 figure, and even more strikingly in New York City it has come down from 280 in 1900 to 50 in 1939, or less than one fifth of the previous total.

THE PRESENT SITUATION

The astonishing progress that has been made in the control of tuberculosis during the past forty years, as evidenced by the statistics just cited, has led to a widespread impression that the fight has been won and that the extermination of the disease is in sight. While this would appear more nearly a possibility than ever before in history, it is the part of wisdom that this be not taken for granted. Tuberculosis is still one of the major causes of death, especially in the younger age groups, and while it no longer holds the center of the stage in the drama of disease it nevertheless still plays a most important role. With the still very numerous foci of infection which exist, it would appear that under certain conditions the disease might easily begin to increase again. Certainly this might be expected if the precautions and methods learned should be relaxed because of satisfied complacency. In the present world crisis, for example, one may properly be concerned over the effect of postwar conditions. The experience of the last world war taught us how easily under conditions of privation, strain and undernourishment the tuberculosis morbidity and death rate can raise rapidly. Also with all of our accumulated knowledge there is still much that we lack which lends certain elements of uncertainty to the situation. As we possess no specific treatment, our methods must still be indirect with especial emphasis on prevention. This includes segregation of infectious cases, earlier diagnosis particularly through mass surveys and follow-up of contacts, with more adequate treatment of discovered cases before they become clinically active. The more widespread use of the x-rays is essential in this program.

It is to be noted that all of these methods are directed against the infection or against disease that it has already caused.

THE FACTOR OF RESISTANCE

There is another aspect of the problem sensed but still imperfectly understood. This is the defense mechanism in the human body against the infection. That this is a very real factor is evidenced by the facts now known that when exposed many escape infection and that of those known to be infected only a little over 1 per cent actually develop clinical disease. The wherefore of this is not definitely known but there are some intimations concerning it. It is well known for example that unfavorable environment predisposes to tuberculosis, which has long been recognized as a disease of the poor. Better opportunity for infection undoubtedly plays a role here, but that lowered resistance is also important seems evident. Natural or constitutional resistance is evidenced by the great variation in susceptibility in individuals, in families and in races. This applies to susceptibility to infection as well as to disease, as shown by the appreciable number of children who, though definitely exposed, fail to react to tuberculin. Natural resistance apparently can be enhanced through generations and possibly in some form it may be inherited.

Insufficient or unbalanced diets play their part. This has been attributed in the past to improper caloric food values, but the increase of knowledge concerning vitamins indicates that they may soon be recognized to be of at least as great importance. At present, however, we lack any precise knowledge of the particular vitamins which may influence resistance to chronic infections such as tuberculosis.

There is overwhelming evidence that a tuberculous infection successfully met changes the reaction of the body to subsequent infections and that this change means increased resistance. Such acquired resistance is only relative and may be overcome by large doses of infection or may be lowered by adverse environmental conditions. This resistance, acquired through many years or generations of exposure to repeated small infections, modifies the character of the disease and diminishes its prevalence.

What will be the epidemiologic consequences when an ever increasing proportion of uninfected persons as seen especially in rural areas are exposed to infection in later life under urban surroundings is still an open question. In other words, is it better to face the vicissitudes of life with a positive or a negative tuberculin reaction? Opinions differ, but the present trend in our campaign against exposure to disease is certainly tending to create a predominantly tuberculin negative population and at the same time the disease itself is diminishing. Theoretically, however, one cannot help but share the apprehension expressed by Bushnell many years ago that under certain favorable conditions this might conceivably lay the foundation for the return of tuberculosis as an acute epidemic disease. What is much needed is some criterion, not yet available, which might afford a basis for discrimination between good and bad risks under undue exposure to infection.

To those who believe in the great protective value of small doses of infection, a system of controlled vaccination appeals as the most satisfactory answer. Many animal and clinical experiments have been made in this field, of which Calmette's BCG is the outstanding example; but neither this preparation nor other experiments have as yet been proved to be of widespread usefulness.

The discussion of this problem has assumed considerable recent importance with regard to the hazards of tuberculosis to the medical and nursing professions, but practically it would appear that this danger has been greatly exaggerated. In the meantime for better or for worse we are rapidly increasing the proportion of "virgin soil" for tuberculosis among our general population.

CHEMICAL POSSIBILITIES

In recent years there has been a shift of research activity from the immunologic field to that of chemistry. The biologic characteristics of the tubercle bacillus are quite different from those of the streptococcus and the pneumococcus and among them apparently is an increased resistance to the destructive or inhibitive action of chemical substances introduced into the living body. The challenge in the direction of chemotherapy has, however, a great appeal and hopes for the future are not without a reasonable basis.

This necessarily cursory review of the story of tuberculosis reveals grounds for great satisfaction. Made possible by scientific research, guided by medical skill and strengthened by the social and economic forces released by a widespread diffusion of knowledge to the public, the struggle to overcome the "Great White Plague" has attained notable successes.

As already indicated, there still remains much to be done. What part is to be played by the medical profession in what we hope may be the concluding acts of the drama?

PRESENT MEDICAL RESPONSIBILITIES

Earlier Diagnosis.—X-ray examination is the cornerstone. The cases of pulmonary disease which may be considered really early can be discovered only by this means. When definite physical signs are present, the disease is usually already advanced. The history of suggestive symptoms is the indication for a prompt x-ray examination. Surveys by combined x-ray and tuberculin examinations for groups of apparently healthy people should have the active support and cooperation of physicians, but as individuals their chief responsibility is to concentrate especial attention in the most likely direction; this means on certain races, on certain economic groups and, for all classes, on the contacts with known cases.

The Better Practice of Preventive Medicine.—This includes not only the activities just enumerated but also a consistent effort to build up general health so that any later infection can be the better resisted. In this age of preventive medicine it is to be feared that many physicians still neglect its practice in favor of attention to the more insistent demands and the greater medical interest of frank cases of disease.

Cooperation with Public Health Authorities.—These authorities have the direct responsibility for the control of infectious diseases. They must work largely through physicians. If we as physicians assumed a greater individual responsibility to act as self constituted health officers for those patients under our care, the combined effect of private and public effort might well be irresistible.

Provision for Prompt and Adequate Treatment.—Strict bed rest is the most essential factor in the treatment of cases of active disease. In the really early cases the results are prompt and remarkable. Bed rest is applicable not only to cases in which there is fever but also to many afebrile cases in which other manifestations of activity are present. Change of climate, so long advocated, is definitely subordinate in importance to rest and in many active cases the journey involved in changing climate is absolutely contraindicated. Later, during the convalescent stage, a change to a more favorable climatic environment, especially for city cases, is of real value but should always be combined with proper medical supervision.

The proper regimen of a rest cure is always difficult in the home and often is impossible. Unless the home conditions can be made right or if the physician in charge is not experienced and interested in the numerous small but essential details involved, institutional care in hospital or sanatorium is necessary. Moreover, the educational and training value of the sanatorium regimen is very great not only at the time but also later when the patient goes out to face the problems of the return to normal life.

The various forms of collapse therapy have great value in properly selected cases. That so large a proportion of all cases, about 40 per cent, are now treated by these methods is, however, a reflection on the efficacy of our early diagnosis and treatment, for these cases are already advanced in the disease. Nevertheless, collapse therapy saves many lives otherwise doomed and, while it still presents many difficulties and problems, it represents the greatest major advance in the treatment of pulmonary tuberculosis of our generation.

Incidentally it has revived a surgical interest in tuberculosis which is valuable for the proper understanding and treatment of the nonpulmonary forms of the disease as well.

The vital importance of time must be emphasized in all forms of treatment as well as in diagnosis. In the latter the interval should be short between incidence and diagnosis; in the former it should be long, far longer than is frequently appreciated. Many an apparent cure has been ruined by a premature return to normal life.

All patients, however well they may appear, require a careful follow-up with periodic medical supervision for several years, which is essential if disappointing relapses are to be avoided.

While we as physicians are carrying out these generally accepted principles of treatment we should be receptive to the possibilities of a better and more specific form of treatment. Cautiousness in accepting any such cures is warranted by numerous bitter experiences and by our realization of the peculiar difficulties of the problem; nevertheless, both the hope and the possibility exist and when they are realized the wise physician will be the most eager to give the method a fair trial and also be the best judge of its efficacy.

Thus I bring to a conclusion this brief survey of our progress in the knowledge and measurable conquest of tuberculosis.

To physicians the story may well bring satisfaction in the achievements of the past but it also presents a challenge for the future. Scientists have pointed and will continue to point the way. Sanitarians and sociologists will largely apply the principles established. But on physicians has always rested the responsibility for meeting the actual problems at first hand and it is on their skill in diagnosis and treatment that continued success largely depends. It is my hope that the history of the way that we have come will throw some sidelights on our present knowledge and also point the way for future progress.

The problems of chronic illness may not be as dramatic as the sudden crises of acute disease, but from their very duration they more profoundly affect individual, family and community welfare.

Tuberculosis is still one of the most prevalent and important of these diseases. The physician who finds it worth his while to study it carefully will realize that, while there is still much that is not known, his effort to acquire and apply present knowledge will find him closely in touch with many other diseases and he will be led to study not only the lungs but also practically every organ of the body. He will meet personal and family problems which demand a human and psychologic approach. He will be brought to a realization of the importance of social and environmental conditions, the study of which will greatly broaden his horizon. Lastly he will appreciate that tuberculosis is a community problem which in importance even outweighs the interests of the individual and of the family.

Thus tuberculosis demands much of the physician. It is a challenge to our best effort. The degree to which we meet this challenge is a measure of our achievement as physicians and as citizens and will determine our ability to continue to play the leading role in this great drama.

133 East Sixty-Fourth Street.

Council on Industrial Health

MEDICAL SERVICE IN INDUSTRY

THE COUNCIL ON INDUSTRIAL HEALTH HAS APPROVED THIS ARTICLE AS ONE OF A SERIES ON MEDICAL SERVICE IN INDUSTRY WHICH WILL APPEAR FROM TIME TO TIME IN THE JOURNAL.

C. M. PETERSON, Secretary.

THE PLACE OF MEDICINE IN INDUSTRY

Industry's earliest medical need was for competent surgical treatment of injuries actually or likely to become compensable. For most employers this obligation remains the most important and often the only motive for providing medical service. Consequently this relationship is the sole point of contact with industry and industrial health methods for most physicians. Many factors tend constantly to modify this traditional concept of medicine's usefulness to industry. Society through occupational disease legislation demands that industry protect its employees not against accidents alone but against any harmful health experience associated with work as a cause. Experience in the safety movement turns the attention of employers to prevention as a cardinal principle for lowering the incidence of disability suffered by workmen whether through accident or disease, industrially induced or otherwise. This attitude is significant. It implies a gradual but steady reduction in the amount of required remedial service now provided by industrial medicine and surgery. In place of it the physician in industry will be asked to supply more and better preventive medicine, employing methods, equipment and special information now falling within the province of industrial hygiene.

VALUE TO THE EMPLOYER

As a rule an employer adopts a plant medical program containing functions beyond his legal obligation because he is convinced that such practices represent an improvement in the conduct of his business. Therefore a physician who is asked to supply these services should make it a point to comprehend the nature of the business with which he is to be associated and to understand how and why he can be of value to it. The essential purpose of any industry is the development of goods and services of such quality and price as to permit the widest possible distribution. Procedures calculated to accomplish this purpose are well defined by custom and long experience in many industries. Elsewhere they may be exceedingly complicated. Often extensive consumer research is necessary, as well as designing of an engineering nature. Markets must be developed, sustained and augmented by advertising and efficient distribution. Competition must be met, restrictive legislation conformed with, and provision made for taxation and finance. Facilities for the conduct of the business must be provided with proper equipment so arranged as to promote efficient production. Workmen must be employed and trained for specific jobs under competent supervision. Sound business management requires that trained manpower be conserved, kept in good physical condition and maintained steadily at gainful employment. It is through the successful accomplishment of this maintenance function that the physician in industry can make himself most helpful and not infrequently indispensable.

VALUE TO THE EMPLOYEE

The first objective of all industrial health activity is to promote the physical welfare of every worker. Certainly the interests of employer and employee are most nearly identical under an arrangement which tends to reduce all loss of working time because of sickness or injury. Individual workers stand to gain substantially in every instance in which the industrial medical service is competently and fairly administered. The advantage to the worker rests not solely on improved earning power through steadier employment but by proper placement in work fitted to his physical and temperamental makeup.

SCOPE OF INDUSTRIAL HEALTH

These values, which have been assigned by employer and employee alike, are responsible for the growth of interest in industrial health and for increasing demands on physicians to supply medical services to industry. This interest has been

productive of much good as well as of some misdirection and abuse. The medical profession has as a result developed a point of view which has the intent of defining the proper scope of industrial medical activity and of unqualifiedly condemning conditions which make it impossible to maintain adequate standards of medical performance.

In keeping with this broad opinion, the Council on Industrial Health believes that a properly administered industrial health program should:

1. Prevent disease or injury in industry by the establishment of proper control over industrial environment.
2. Promote restoration to health and earning capacity as promptly as possible after industrial injury or disease.
3. Conserve the health of workmen through physical supervision and education.

These are expressions concerning scope and not of specific functions. On the acceptance of these principles rests the justification for the development of industrial health as a special field of medical interest distinct from private practice and through which at the same time the aims of industrial and private practice are reconciled.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORT. HOWARD A. CARTER, Secretary.

PLASMATIC THERAPY INSTRUMENT NOT ACCEPTABLE

Manufacturer: Physical Medicine Instrument Company, Architects Building, Indianapolis.

At times, in order to fulfil its assumed obligations to the medical profession and to the public, the Council may consider itself called on to investigate and prepare reports on devices which have not been submitted, if such reports, in the opinion of the Council, are important to public health and welfare. The advertising and promotional matter distributed by the Physical Medicine Instrument Company have been inspected, and this report is based on them.

In the advertising used to promote the so-called Plasmatic-Therapy Instrument, F. B. Knyvett is designated as "Creator and developer of Plasmatic-Therapy." As part of the promotional matter Mr. Knyvett distributes a reprint of an article entitled "Pasturizing the Blood (Pyretotherapy with Conductive Heat)" in which are reported cases in which the Plasmatic-Therapy Instrument was used. Elsewhere in the advertising Knyvett writes that every case reported in the article was personally treated by him under the direction of a physician.

The Plasmatic-Therapy Instrument is described in the article as "... an apparatus which will introduce heat into the circulating blood without altering the balance of temperature that is normally maintained by the healthy body, and that will accelerate and control the pulse rate to within five beats per minute. . . . The Plasmatic-Therapy apparatus directly heats the blood." It is stated that the apparatus should be very useful to the average clinician because it makes it possible for him "... to administer pyretotherapy, which appears to be in some respects just as effective as that attained by the production of artificial fever or hyperpyrexia" most conveniently in his office. In this manner, the article explains, it is possible to obtain the benefits of fever therapy with none of the attendant disadvantages such as hospitalizing the patient or employing specially trained technicians, and it is possible to do this with an instrument much less costly than the apparatus used in fever therapy. The treatment is said to involve practically no discomfort to the patient, and shortly after the treatment is completed it is possible for him "... to safely dress and go about his business." The technic for "plasmatic" therapy treatment is said to be as follows:

"In basic outline, the plasmatic therapy treatment consists of surrounding the patient with two special long, narrow, heating units, each of which extends from the axilla, under the sole of the foot, and up the inside of the leg and thigh to the groin, where the two are connected. He is then enveloped in a sheet,

a blanket or two, and a special rubber blanket. None of these coverings is wrapped so tightly as to constrict any part of the body enough to cause discomfort. The current, coming through an ingeniously constructed adjusting, timing, and regulating cabinet, is then turned on, and will be automatically turned off at the end of a predetermined period—from 30 to 60 minutes or more, as desired. Meantime the patient's pulse and temperature may be taken and recorded about every 10 minutes. Sweat should be wiped from the face as it collects, and water given through a drinking tube, as and if desired by the patient. This very simple attention which requires no special technical training, is all that is necessary unless definite discomfort should develop. . . ."

Ten cases are then reported in which this therapy was used. It is claimed that most of the patients had been previously treated by conventional or established methods which had failed to result in any improvement in the patient's condition. A series of plasmatic therapy treatments are said to have produced remarkable results in every case. In the case of a complete recovery from the effects of an attack of poliomyelitis, it is stated, "This case was investigated by representatives of the Press, and reported in the metropolitan newspapers."

The Council has often expressed the opinion that the administration of physical therapy and the use of physical therapy apparatus should be in the hands of trained individuals. To direct treatment intelligently it is imperative that the individual administering the treatment understand the technic so that he may avoid the dangers that may result from ignorance. Since the article advises that a person with no training is competent to administer the treatment, it leads the Council to believe that the exaggerated claims made for the instrument may not have been substantiated by careful clinical examination.

To promote the sale of the Plasmatic-Therapy Instrument a communication signed by F. B. Knyvett is addressed to physicians and contains this opening sentence: "Dear Doctor; Would you like to add \$600.00 a week to your income?" The "Earning Possibilities" of the Plasmatic-Therapy Instrument are then explained in detail and actual instances of physicians' earnings from the device are cited. For example, "A physician with offices in 57th Street, New York City, \$1800.00 in the first 3 weeks. . . . A town over 1,000,000; this physician never previously had even a lamp in his offices. From November 4th to November 21st, \$1265.00 in Cash Fees."

The question "Is A Special Technician Necessary For Such Work?" which is used as a heading in the letter is answered with these statements: "The answer is NO. Any office assistant can be taught in five minutes how to operate the instrument. Most physicians have found this an ideal way to make use of an otherwise idle office assistant—who previously only answered the phone during the Doctor's morning at the Hospital. Any such assistant can give from eight to ten treatments a day. After the first examination and authority for treatment, it is not necessary for the physician to be present at the Sessions."

In the section headed "What Are the Usual Fees For Treatment?" the physician is given this advice: "The most satisfactory manner in which to charge patients has been found to make a charge for a series of treatments—not so much for each individual treatment. The usual fee is \$75.00 for a series of eight treatments. A large number of your cases will be remitted in this number of treatments. In chronic conditions, such as multiple-sclerosis, post encephalitis, locomotor-ataxia, osteoarthritis, diabetes, endarteritis-obliterans, etc., you cannot hope to bring a patient to recovery in any such series. In such cases, the patients are charged \$50.00 for the second, and all other series, of 8 treatments each. Many physicians have received the surprise of their life, when a patient, suffering from a chronic condition, who is owing large sums for previous treatment, will go out and borrow the money for plasmatic-therapy treatment."

In another section of the promotional letter it is stated "We provide with the instrument a 100-page detailed instruction book covering the method of treatment, conditions suitable for treatment, attention to the patient during treatment and all other necessary data. In addition, we offer you proved suggestions on how to get new patients in an ethical and legitimate manner together with suggestions on what fees to charge, and how to collect them." This statement also is made: "We have had a

number of individuals from California to Maine, write us asking where they could obtain plasmatic-therapy treatment; the result of their reading an article on what had been accomplished by plasmatic-therapy, which they perused in a Journal in their own Physician's waiting room!"

The use of promotional material in which financial gain to the physician is stressed is highly objectionable. The implication is made in a promotional letter that the Plasmatic-Therapy Instrument has been submitted to and accepted by the American Medical Association. This implication is completely erroneous.

The Therm \mathbb{R} , manufactured by the Op-Al Electric and Manufacturing Company, Indianapolis, a device also promoted by Mr. Knyvett, was submitted to the Council on Physical Therapy in 1934. The unit was an elaborate device for the heating of various body orifices and consisted of a chromium-plated steel cabinet containing diversified controls and regulators, and a number of varieties and shapes of applicators. The device was investigated in the urology and physical therapy departments of a clinic acceptable to the Council. A report was sent to the firm, Sept. 16, 1935, stating that "Because of the unfavorable clinical report, and because of the failure of the firm to submit acceptable advertising matter, the Council on Physical Therapy voted not to include the Therm \mathbb{R} apparatus in its list of accepted apparatus." The report was not published in THE JOURNAL because, according to information received from the firm, the unit was no longer being manufactured.

A nine page advertising booklet entitled "The Blood is the Life" (a Biblical quotation), copyrighted by F. B. Knyvett, is said to explain the theory behind "Plasmatic-Therapy." Four pages of the booklet are used to inform the reader that blood is the vital fluid of life and that the plasma is an important part of the blood. On page 7 this statement is made: "If Pasteur was able to destroy all harmful bacteria in milk, wine, and other foods, by the action of controlled heat, it would certainly be within the bonds of possibility that we can do the same thing in the living blood!" Thus is Plasmatic-Therapy said to be a method of "... introducing heat DIRECTLY into the blood stream ... !" or of "Pasteurizing the Blood!"

It is the opinion of the Council that insufficient critical evidence has been presented to substantiate the claims made for the instrument by the firm, and that the manner in which the apparatus is advertised and promoted is detrimental to the interests of both the public and the medical profession. The Council voted not to include the Plasmatic-Therapy Instrument on its list of accepted devices.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

LIVER AND STOMACH PREPARATIONS (See New and Nonofficial Remedies, 1940, p. 320)

POWDERS FOR ORAL ADMINISTRATION

(See New and Nonofficial Remedies, 1940, p. 323)

LIVER EXTRACT-ABBOTT.—A dried, powdered, nitrogenous, fat-free, water-soluble extract, prepared from fresh mammalian livers. The daily oral dose of approximately 25 Gm. (fifty capsules) has been found to produce the standard reticulocyte response defined as 1 U. S. P. unit (oral) when assayed in cases of pernicious anemia as required by the Council.

Actions and Uses.—Liver extract-Abbott is used in the treatment of pernicious anemia. See the general article Liver and Stomach Preparations, New and Nonofficial Remedies, 1940, p. 320.

Dosage.—Initial dose fifty capsules (approximately 25 Gm.) daily until examination shows a satisfactory blood cell count. The dosage is then kept at a level which will maintain remission.

Distributed by Abbott Laboratories, North Chicago, Ill. No U. S. patent or trademark.

Fresh edible liver is extracted with water at 170 F. for thirty minutes and filtered. The filtrate is concentrated in vacuo and then dried in vacuo. The dried material is powdered and filled into capsules. Each capsule contains the extract from 10 Gm. of fresh liver.

SOLUTION FOR PARENTERAL ADMINISTRATION

(See New and Nonofficial Remedies, 1940, p. 327)

LIVER EXTRACT (INJECTABLE) U. S. P.-ABBOTT, 5 UNITS PER CC.—A sterile aqueous solution of liver preserved with 0.5 per cent of phenol. The daily parenteral administration of 0.2 cc. has been found to produce the standard reticulocyte response defined as 1 U. S. P. unit (injectable) when assayed in cases of pernicious anemia as required by the Council.

Actions and Uses.—Injectable liver extract U. S. P.-Abbott is used for intramuscular injection in the treatment of pernicious anemia. See the general article Liver and Stomach Preparations, New and Nonofficial Remedies, 1940, p. 320.

Dosage.—Daily intramuscular injections of from 0.5 to 1 cc. may be given until the reticulocyte peak has been reached. The dosage is then kept at a level which will maintain remission.

Distributed by Abbott Laboratories, North Chicago, Ill. No U. S. patent or trademark.

Injectable Liver Extract, U. S. P.-Abbott (5 U. S. P. units per cc.), 10 cc. vial.

Injectable Liver Extract, U. S. P.-Abbott (5 U. S. P. units per cc.), 50 cc. vial.

Fresh edible liver is extracted with water at 170 F. for thirty minutes and filtered. The filtrate is concentrated in vacuo and extracted with 70 per cent alcohol; the alcoholic extracts concentrated in vacuo and precipitated with ammonium sulfate. The precipitate is further purified by alcoholic fractionation, the alcohol removed and the extract made up to volume so that each cubic centimeter contains the extract from 50 Gm. of fresh liver. Five tenths per cent phenol is used as a preservative.

SOLUTION FOR PARENTERAL ADMINISTRATION

(See New and Nonofficial Remedies, 1940, p. 327)

LIVER EXTRACT (INJECTABLE) U. S. P.-ABBOTT, 10 UNITS PER CC.—A sterile aqueous solution of liver preserved with 0.5 per cent of phenol. The daily parenteral administration of 0.1 cc. has been found to produce the standard reticulocyte response defined as 1 U. S. P. unit (injectable) when assayed in cases of pernicious anemia as required by the Council.

Actions and Uses.—Injectable liver extract U. S. P.-Abbott is used for intramuscular injection in the treatment of pernicious anemia. See the general article Liver and Stomach Preparations, New and Nonofficial Remedies, 1940, p. 320.

Dosage.—Daily intramuscular injections of from 0.25 to 0.5 cc. may be given until the reticulocyte peak has been reached. The dose is then kept at a level which will maintain remission.

Distributed by Abbott Laboratories, North Chicago, Ill. No U. S. patent or trademark.

Injectable Liver Extract, U. S. P.-Abbott (10 U. S. P. units per cc.), 5 cc. vial.

Injectable Liver Extract, U. S. P.-Abbott (10 U. S. P. units per cc.), 10 cc. vial.

Injectable Liver Extract, U. S. P.-Abbott (10 U. S. P. units per cc.), 30 cc. vial.

Fresh edible liver is extracted with water at 170 F. for thirty minutes and filtered. The filtrate is concentrated in vacuo and extracted with 70 per cent alcohol; the alcoholic extracts are concentrated in vacuo and precipitated with ammonium sulfate. The precipitate is further purified by alcoholic fractionation, the alcohol removed and the extract made up to volume so that each cubic centimeter contains the extract from 100 Gm. of fresh liver. Five tenths per cent phenol is used as a preservative.

SULFAPYRIDINE-SODIUM (See J. A. M. A. March 30, 1940, p. 1156).

Sulfapyridine Sodium Monohydrate-Calco.—A brand of sulfapyridine sodium-N. N. R.

Manufactured by Calco Chemical Division American Cyanamid Co., Bound Brook, N. J. U. S. patent applied for. No U. S. trademark.

SULFANILAMIDE (See New and Nonofficial Remedies, 1940, p. 489).

The following dosage form has been accepted:

Tablets Sulfanilamide, 5 grains.

Prepared by Flint, Eaton & Company, Decatur, Ill. No U. S. patent or trademark.

THIAMIN CHLORIDE (See New and Nonofficial Remedies, 1940, p. 528).

Thiamine Hydrochloride-Merrell.—A brand of thiamin chloride-N. N. R.

Manufactured by the William S. Merrell Company, Cincinnati.

Ampuls Solution Thiamine Hydrochloride 1.0 mg., 1 cc.

Ampuls Solution Thiamine Hydrochloride 6.0 mg., 1 cc.

Ampuls Solution Thiamine Hydrochloride 10.0 mg., 1 cc.

Thiamine Hydrochloride Tablets-Merrell, 1.0 mg.

Thiamine Hydrochloride Tablets-Merrell, 3.0 mg.

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SATURDAY, OCTOBER 12, 1940

PHYSICIANS NEEDED FOR INDUCTION BOARDS

After registrants are accepted by local draft boards they will be sent for physical examination to medical induction boards. About one hundred such boards will be set up throughout the country, about half of them near army posts and stations. Each board will consist of three internists, one general surgeon, one orthopedic surgeon, two ophthalmologists, one otorhinolaryngologist, one neuropsychiatrist, one clinical pathologist and one dentist.

As explained by Colonel Love last week in *The Journal* (pages 1201-1202), the specialists to be assigned to such service will probably include civilian specialists as well as reserve officers, who will be on temporary duty. Civilian physicians will be on a per diem basis and will be used as long as their services are required. It has been proposed that they be paid at the base pay of major with allowances for travel and subsistence while on duty. Physicians preferred for this service are those who, on account either of age or of physical infirmities or because of reasons affecting their civil life, cannot go into military camp. It has been tentatively estimated that the time required for this service might approximate twenty to thirty days in the period between October 16 and February 1.

In order to aid the Army Medical Department in securing physicians for this service, the Committee on Medical Preparedness requests physicians who wish to volunteer to write at once to the Committee on Medical Preparedness, 535 North Dearborn Street, Chicago, marking the envelop "Induction Boards."

THE MEDICAL CONTROL OF MOBILIZATION

The medical problems presented by mobilization are already taxing the ingenuity of those responsible for the program now pending. The late Hans Zinsser,¹ basing his reasoning on experiences in the mobilization camps in 1917, pointed out that outbreaks of epidemics are almost inevitable when large numbers of men from all over the country are brought together in camps under circumstances which call for arduous physical and disciplinary training. Much control over the epidemic intestinal diseases such as typhoid and dysentery can

be exerted by suitable preventive measures, but the situation with regard to respiratory diseases is more difficult. In such conditions as measles and mumps neither prevention nor treatment can be much better controlled than formerly. The importance of these diseases is emphasized by a citation of the figures: among the enlisted men who were serving in the United States during the year 1918 there were 102,950 cases of mumps.

Zinsser was convinced that the unimpeded flare-up of infectious diseases among young military units is stimulated by two factors: the too rapid bringing together of large numbers of susceptible young men with large numbers of carriers of the various respiratory organisms and the quite natural but too energetic efforts to force military training and the physical hardening process at a pace too strenuous for the relatively soft recruit. The evidence backing these beliefs is impressive and the countervailing measures suggested deserve practical trial. Such trial involves in part a change to a scheme of "gradual mobilization," which can be carried out in any one of a number of different ways. The assembly of large troop units can be developed in successive stages, beginning with small units and gradually joining these into larger units so that early medical supervision can be more carefully carried out. Military training or conditioning can be so graded that the necessary "hardening" is achieved without mass reduction of resistance to infection. The program adopted, however, should take into consideration the epidemiologic experiments of Greenwood and his co-workers,² some of whose conclusions, although carefully restricted to mice by them, deserve attention for their implications with regard to mobilization. Among them may be mentioned especially the conclusion concerning the general character of the epidemic process as revealed in herds of mice living in close and continuous contact and subject to the continuous or intermittent migration of susceptible individuals; thus it was shown that ectromelia, a virus disease of mice, under these circumstances will never normally die out.

Military mobilization presents a challenge and an opportunity. Available epidemiologic information such as that discussed must be utilized in planning each step of the assembly and care of the new recruits. The behavior of epidemic diseases under the different circumstances which develop must be carefully recorded and analyzed. Only by immediate concentration on these two objectives will it be possible to profit fully from the unique epidemiologic opportunity furnished by mobilization.

1. Zinsser, Hans: On the Medical Control of Mobilization, Mil. Surgeon 87: 214 (Sept.) 1940.

2. Greenwood, Major; Hill, A. B.; Topley, W. W. C., and Wilson, J.: Experimental Epidemiology: Medical Research Council Special Report Series, No. 209, London, His Majesty's Stationery Office, 1936.

METHODS USED FOR IMPROVING ATHLETIC PERFORMANCE

The term "doping" was originally used to describe methods designed to increase the functional efficiency of athletes by means of highly active drugs. Now it is employed to describe any method of improving athletic performance temporarily either during training or in connection with competitive events. Bøje¹ has classified such substances into four groups: food preparations, oxygen, artificial sunlight and pharmaceutical substances.

Most of the food preparations, especially dextrose or sugar, which provide calories in a readily acceptable or otherwise suitable form are unobjectionable medically, Bøje feels. The evidence for the use of lecithin is not convincing and there seems to be no reason why it should be recommended for improving athletic performance. Similarly there is no experimental basis on which to recommend the use of yeast, although it does not appear to be deleterious. Conclusive evidence on the role of liver preparations in muscular work and its efficacy for increasing physical energy is also lacking.

Phosphates which have been employed can often cause a purely subjective feeling of freshness and zest for exercise which may amount to a condition of euphoria. Bøje concludes that phosphates taken in quantities exceeding the amounts found in a normally varied diet can probably increase the output of the organism. Although there is considerable loss of salts in heavy physical effort, this is probably insufficient to warrant administration of salts except in prolonged contests. Alkalis, usually in the form of sodium carbonate, have also been employed. Before deciding to administer them, attention should be given to the fact that the change produced by exertion in the p_H of the blood and its carbon dioxide tension influences among other things the regulation of respiration. Further, the administration of alkalis by mouth constitutes such a violent interference with the whole p_H regulatory system that it is as likely to be detrimental to the maximum physical output as the reverse. For a small group, such as aviators and mountaineers, ammonium chloride can be considered as an agent capable of increasing functional capacity. Other than for occasional slight local irritation, there can be no medical objection to its use.

The use of pure oxygen as a "dope" has been discussed from time to time. It may be granted that if it is administered immediately before the start of a contest, especially in the case of underwater swimming, it may exert some favorable effect. Nevertheless Bøje feels that most athletes and sports leaders have a fanciful and confused idea about the meaning of "oxygen priming" and that it is highly questionable whether the inhalation of oxygen is of any advantage in ordinary sports events.

Much has been said recently about the value of ultraviolet rays in connection with athletic training. Certainly if administered in suitable doses ultraviolet radiation should not produce any dangers, although athletes who are not used to ultraviolet rays should refrain from exposure immediately before taking part in competitions.

Pharmaceutical substances have been used in athletics based on their influence on the nervous system either as stimulants or as soothing agents. The toxic action of alcohol so overshadows its other effects that its role as a source of energy is of little athletic importance. Ether has been included by some as a "doping" agent but its use does not appear to assume any real importance in connection with sports. "Smelling salts," usually consisting of a solution of ammonia and of ammonium carbonate combined with ethereal oils, is popular in the prize ring and can be pronounced harmless.

Cocaine is one of the oldest known forms of "dope," although the extent to which it is now used by athletes is unknown. Leaving aside the question of whether or not it affects metabolism favorably, its influence on the central nervous system, which constitutes the motive for its use as a stimulant, cannot be questioned. Cocaine is effective in removing the sensation of fatigue and can in this manner undoubtedly raise the level of performance in the course of prolonged effort. This mechanism, however, is dangerous; it may have acute intoxicating effects when used in large doses. Its repeated use engenders addiction. Cocaine should never be used in connection with athletics.

Caffeine and other purine derivatives, although widely used as stimulants in connection with physical and mental effort, do not appear to have any established effects in connection with brief physical effort. Definite conclusions cannot be derived from the few available experiments on extended exercise. Furthermore, it is difficult to gauge how far coffee, chocolate and cocoa given to athletes in normal therapeutic doses as a physical stimulant can endanger their health. It seems likely that any substance capable of stimulating the body to exertion beyond the normal limits of fatigue set by the body will prove injurious.

Amphetamine sulfate is much more capable than caffeine of eliminating the sensation of fatigue; the overwhelming evidence of its toxicity, together with the fact that it is not definitely established that performance is improved, indicates that this substance should not be used in connection with athletics. Moreover, the application of extra stimuli or a weakening of natural powers of resistance in organisms undergoing a severe strain must involve risks.

The group of drugs including valerian, bromides and barbituric acid derivatives can be included, but there seems to be no danger of abuse among athletes since every one of these substances has powerful fatigue-producing properties. Digitalis and glyceryl trinitrate

1. Bøje, Ove: Doping: A Study of the Means Employed to Raise the Level of Performance in Sport, Bull. Health Organ., League of Nations S: 439, 1939.

likewise can be readily eliminated both because of insufficient evidence of their "doping" properties and because of their toxic effects. Nikethamide and metrazol have been employed by athletes because of their stimulating influence on the circulation and the central nervous system, which produces a definite subjective feeling of freshness in the tired organism. There is, however, nothing to show that recovery is improved and there are deleterious effects, especially in the convulsive properties of both substances. The use of such products by athletes should be definitely avoided. Finally, although various endocrine products have been tried the evidence on this subject is so flimsy that their use should be avoided, since it may involve dangers the extent of which cannot be evaluated.

Medical advisers must naturally strictly forbid the use of any agent suspected in any manner of being deleterious or any substance which may cause the least direct danger of whipping up the organism to extreme exertion. Although there can be little objection to the use of nutrient agents, of vitamins and of oxygen, the medical adviser should also do everything he can to discourage the use of costly and ineffectual substances.

Current Comment

THE CONSERVATION OF MEDICAL RESOURCES

An uninterrupted supply of qualified doctors of medicine to meet the future demands of adequate national preparedness and the needs of the civilian population is vital to the future of our nation. The Committee on Medical Preparedness of the American Medical Association urged last July that preparation for the conscription of the man power of this country should include provision for the continuation of medical education of students in medical schools and of interns in approved institutions. The Selective Training and Service Act of 1940 does defer the conscription of students in schools but only until next July. Specific deferment is not provided for those who may be completing their medical training as interns or as residents. An amendment has now been proposed to the Selective Training and Service Act of 1940 by Senator Murray of Montana in the form of a bill, S. 4396, providing that "medical and dental students at recognized medical and dental schools, and interns and resident physicians, surgeons and dentists at recognized hospitals" shall be exempt from training and service but not from registration. Any such student, intern or resident, the bill continues, who is a member of a reserve component of the land or naval forces of the United States shall not be ordered or called to active duty or into active service in any such forces without his consent, except in time of war. Finally it is proposed that any person selected for training and service under the act (1) who has been awarded a degree of doctor of medicine or doctor of dental surgery by a recognized medical or dental school, (2) who holds a valid license

to practice medicine or dentistry and is engaged in such practice at the time of his selection, and (3) whose physical and mental fitness for such service has been satisfactorily determined shall in lieu of induction for training in service be commissioned as an officer in the Medical Department Reserve, Officers' Reserve Corps, and ordered into active military service of the United States as provided in the joint resolution approved Aug. 27, 1940, by which the President was authorized to call into active service members of the National Guard and Reserve components of the Army. Senator Murray's bill was referred to the Senate Committee on Military Affairs. A companion bill, H. R. 10587, is pending in the House Committee on Military Affairs. Until and unless these measures become law interns, medical students and residents should provide for local selective service boards information and affidavits indicating their desire for exemption because of essential work for the public health.

THE SCIENTIFIC EXHIBIT

As the years have passed, the Scientific Exhibit of the American Medical Association, which began with a few demonstrations made by pathologists, has developed into a vast assemblage of the newest research in all the fields of medical science presented by those who are doing the work. The demonstration recently held in New York represented the very peak of what is accomplished for the graduate education of physicians by an exhibit of this kind. In the current issue of the *American Journal of Public Health* Dr. D. B. Armstrong and John Lentz publish a survey of health interests and present the following comment regarding the Scientific Exhibit in New York:

The Scientific Exhibit, an annual feature of the conventions of the American Medical Association, was viewed by thousands of physicians and representatives of related professions during the recent meeting in New York City. No one who witnessed the 1940 array of exhibits could fail to be impressed by the fact that it constituted a remarkable demonstration of the amount and variety of research and of professional education that are being undertaken under all kinds of medical auspices today. The exhibit particularly reflected the serious and exhaustive inquiries into the mysteries of medicine that are being made by private practitioners and by voluntary groups of medical men. It emphasized the great effort to enhance precision and utility as regards diagnosis and treatment in the many fields of specialization. The keen study given the exhibits by the thousands of professional visitors was another most encouraging sign.

Critics of medicine have classified it as a sordid trade or a moribund science—characterizations with which all would disagree who had the privilege of seeing the manifest growth, vitality and scientific integrity evidenced by the Scientific Exhibit at the 1940 and previous conventions of the American Medical Association. The threats of litigation and regimentation in medicine are unimportant and transient when measured against the long-time and far reaching significance of this demonstration of medicine's perpetual search for truth in its service to mankind.

On many occasions, physicians have said that a survey of this exhibit by those who are most vociferous in their attacks on modern organized medicine would serve to do much to put in their minds a wholesome respect for the dignity and the service of American medicine.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

CAUSES FOR REJECTION FOR ENTRANCE INTO THE REGULAR ARMY DUE TO PHYSICAL DEFECTS

GEORGE E. LEONE, M.D.

Captain, Medical Corps, U. S. Army; Medical Inspector for
Recruiting, Second Corps Area

New York

In a preliminary statistical report on the causes for rejection due to physical defects of applicants for enlistment into the Regular Army of the United States some interesting observations were made. The report covered a three month period, June, July, August 1940, of applicants examined physically in the Southern New York District of the Second Corps Area, which includes New York City proper. These examinations were conducted by full time medical examiners under the direct supervision of Regular Army medical officers at 39 Whitehall Street, New York City. The applicants were for original enlistment into the Regular Army during an intensive recruiting campaign and the physical standards as set forth by the War Department, Army Regulations 40-105, were applicable. The age group included young men between the ages of 18 and 35, unmarried, citizens of the United States, having no record of conviction of a felony, and having the education or equivalent of the eighth grade. Many were high school and college graduates.

The total number of applicants covered by this report was 6,743, and of this total 2,195 were rejected for failure to meet the physical requirements. Thus more than 32.5 per cent, or nearly one third of all the applicants who presented themselves for physical examination, having had the other qualifications, were found physically unfit to become soldiers of the Regular Army.

What were the causes for these rejections? The major causes revealed by this report were failure to meet the requirements with regard to the following, in the order of their importance numerically:

1. Teeth.
2. Eyes.
3. Height and weight (stature).
4. Feet.
5. Ears.

Teeth.—Failure to meet the dental requirements stands out as the most important cause for rejection. Of the total number rejected during this period, that is, out of 2,195, there were 516 rejections due to teeth, more than 23 per cent of the total number rejected. It is difficult to convince young men that good sound teeth are necessary for healthy soldiers and more than one disappointed applicant who has been rejected because of poor teeth has exclaimed "What is the idea? Do we have to bite the enemy?" A minimum number of serviceable teeth have been set down as the require-

ments and it was amazing to find how many young men who have attended our public educational institutions failed to come up to these minimum requirements. It is well known that the condition of the teeth is a fairly reliable criterion on the general health and habits of young men. An indirect service was done for these young men who were rejected when the poor oral hygiene was called to their attention, and many expressed surprise and desire for corrective measures.

The requirements for teeth as set forth by Army Regulations are "a minimum of three serviceable natural masticating teeth above and three below opposing and three serviceable natural incisors above and three below opposing." Therefore the minimum requirements consist of a total of six masticating teeth and six incisor teeth. All these teeth must be so opposed as to serve the purpose of incision and mastication. Masticating teeth include molar and bicuspid teeth, incisors include incisor and cuspid teeth. Teeth which are involved with severe caries are not to be considered serviceable.

Eyes.—The next in importance as a major cause for rejection was the failure to meet the requirements in vision; 479 applicants, or 21 per cent of the total number rejected, were in this group. Most of these young men who could not see well enough to become soldiers did not wear glasses. Further classification of this particular group found most of them suffering from myopic astigmatism. Practically all of them had been driving motor vehicles and many could not be made to understand why they should be rejected, as they possessed operators' permits to drive.

Height and Weight (stature).—Fifteen per cent, or 308, were rejected because of the inability to meet the requirements for height and weight, the majority falling in the group that were underweight for their height. Experience has shown that great disproportion in the weight and height relation may mean lack of resistance and they usually are the first to break down physically when up against the rigors of military service. Many of those underweight showed signs of undernourishment and were potential candidates for tuberculosis.

Feet.—A total of 213, or little more than 10 per cent, were rejected because of poor feet. The results from functional tests for good feet were used as a criterion rather than anatomic conformation. Many feet that appeared flat anatomically showed good function when subjected to some strenuous tests. A considerable number of overlapping and hammer toes were found among those who were wearing ill fitting shoes.

Ears.—The fifth major cause for rejection was due to failure to meet the hearing and ear requirements. There were 202, or 10 per cent, in this group. The majority of those rejected in this group were found to be suffering from purulent otitis media in acute or chronic form in one or both ears associated with impaired hearing.

Other Causes.—The accompanying table shows other causes for rejection. No attempt has been made to find the reason for these figures.

The high number of rejections for teeth surprised us. When we compared figures with upstate New York, however, the same ratio held. The majority, perhaps 75 per cent, of the men rejected for dental defects had conditions that were remediable with proper dental treatment and improved oral hygiene. Many teeth, although present, had to be considered unserviceable because of extensive caries. Again, had many of the men rejected for eye defects been equipped with the proper correctable lenses they would have met the requirements.

The table may differ in some respects from the figures to be obtained when the Selective Service Law becomes operative. It must be remembered, however, that the applicants in the group covered by the present report were volunteers—young men who believed they were physically fit to fight for the defense of their country. It is obvious, for instance, that few young men

Rejections Due to Physical Defects, June, July and August 1940

Cause	June	July	August	Total for Three Months Period	
Teeth.....	147	182	187	516	
Eyes.....	145	161	173	479	
Height and weight.....	70	110	128	308	
Feet.....	37	58	118	213	
Ears.....	64	86	52	202	
Skeletal.....	13	34	30	77	
Genito-urinary.....	21	26	25	72	
Neuropsychiatric.....	21	25	21	67	
Allergy.....	12	20	20	52	
Heart.....	7	11	15	33	
Glandular.....	17	9	5	31	
Skin.....	12	6	8	26	
Respiratory.....	6	6	9	21	
Miscellaneous.....	8	13	38	59	
Total rejected.....	581	762	850	2,195	32.5%
Total accepted.....	1,374	1,551	1,623	4,548	
Total examined.....	1,957	2,313	2,473	6,743	
23% of total rejected due to teeth					
21% of total rejected due to eyes					
15% of total rejected due to height and weight					
10% of total rejected due to feet					
10% of total rejected due to ears					

who have the intelligence to become soldiers would voluntarily present themselves for service with the colors if they had active venereal disease. It is only when all the men in a certain age group are required to report for service that a higher percentage of this type of disease is found.

The reason for this report is to present in a preliminary way the major causes for the rejection of our youth from entrance into the Regular Army, especially with regard to the teeth, eyes and ears. It also gives our medical examiners a clue as to what to look for particularly in the examination of applicants. It is also hoped that some preventive and remediable measures may be instituted for the better preservation of the health of the youth of our nation. As a national defense measure this is of vital importance for the future.

Room 811, 39 Whitehall Street.

EVACUATION HOSPITAL ORGANIZED

In cooperation with the defense program of our country, an evacuation hospital has been organized among the staff of the University Hospital and of the faculty of the Ohio State University College of Medicine, comprising twenty-eight medical and two dental officers, with Dr. John W. Means in charge of the unit.

APPOINTMENT IN NAVY MEDICAL CORPS

The Surgeon General of the Navy, Rear Admiral Ross T. McIntire (M. C.), announces that the Medical Corps of the Navy is being increased in strength proportionate with the expanding Navy and the Marine Corps. Examinations for appointments as commissioned officers in the Medical Department of the Navy will be held Jan. 6-9, 1941.

Appointments are being made in the Medical Corps, United States Naval Reserve, of male citizens of the United States, graduates of class A medical schools, who are under 50 years of age and who meet the physical and professional requirements.

The examination to be held in January will be for appointment as assistant surgeon in the medical corps of the regular Navy, effective about two months from date of examination, and for acting assistant surgeon (intern), effective July 1, 1941. Requests for authorization to appear for these examinations should be submitted to the Bureau of Medicine and Surgery, Navy Department, Washington, D. C., in sufficient time to permit the authorization to reach the applicant prior to Dec. 30, 1940.

Applicants for appointments as assistant surgeon must be citizens of the United States between the ages of 21 and 31, must be graduates of class A medical schools and must have completed one year of intern training in a hospital accredited for intern training by the Council on Medical Education and Hospitals of the American Medical Association.

Applicants for appointment as acting assistant surgeon (intern) are not required to submit evidence of previous intern training and are appointed for a period of eighteen months, during which time they serve as interns in the larger naval hospitals which are approved for intern training. After completion of one year of service, acting assistant surgeons are eligible for examination for appointment as assistant surgeons. Acting assistant surgeons and assistant surgeons receive the pay and allowances of a lieutenant (junior grade).

Service for medical officers is active professionally and attractive in the shore duty, sea and foreign shore station assignments. In the normal rotation of assignments every practicable consideration is given the officer's preference for the type of duty he desires. The Naval Medical School at Washington, D. C., offers a course of postgraduate instruction and instruction in those branches of medicine which apply particularly to the naval service. Under normal conditions newly appointed medical officers are assigned to this course on entry into the service or during their first few years of naval service.

Naval medical officers are encouraged to develop a specialty after they have completed their first cruise at sea. Shortly before completion of his sea duty, the Navy doctor may request special training in the Medical Department specialty in which he is interested. Such requests are acted on by a special board in the Bureau of Medicine and Surgery and, if approved, the Navy doctor is sent to a hospital for training and experience in that specialty for one year. On completion of this training, he is assigned to postgraduate instruction at one of the medical centers in the United States for a period up to one year, after which, as far as is practicable, he is retained in that type of duty. Some of the specialties in which qualifications may be obtained are surgery, medicine, otolaryngology, x-ray, laboratory,

pathology, public health, psychiatry, deep sea diving, aviation medicine (flight surgery), gas warfare and tropical medicine. Several officers have been trained in research particularly applying to problems arising in submarine and aviation activities.

The service affords excellent opportunities for professional advancement. Medical officers receive the same pay and allowances as other officers of the Navy in corresponding ranks and the equivalent amount of service.

A circular of information for applicants for appointment as medical officers of the Navy, containing full information regarding physical requirements, professional examinations, rates of pay and promotion and retirement data may be obtained by addressing the Bureau of Medicine and Surgery.

Applications for appointment in the Medical Corps of the United States Naval Reserve should be addressed to the commandant of the naval district in which the applicant resides. The addresses of the naval commandants may be obtained from the Bureau of Medicine and Surgery.

INSTRUCTION IN SOCIAL HYGIENE FOR NEW YORK NATIONAL GUARD

Lectures on social hygiene are to be presented in each of the armories where the National Guard will be on duty before being transferred to active camp life, through the cooperation of Dr. Lucius A. Salisbury, division surgeon of the New York State National Guard, and Dr. Claude C. Pierce, regional director for the U. S. Public Health Service in the New York area. In New York City, the bureau of social hygiene of the department of health will furnish to the armed forces facilities prepared during the past few years, including moving pictures, exhibits, posters and literature. There are also plans to take advantage of the formation of a home guard to offer modern education in social hygiene. Interested persons are invited to ask for complete information on the facilities available through the bureau of social hygiene, department of health, 125 Worth Street, New York, or from the U. S. Public Health Service, Sub-Treasury Building, Pine and Wall streets, New York. There is no charge.

COMBATING PROSTITUTION IN WIS- CONSIN ARMY CAMP

With the information that immoral interests, which have been known to follow armies in camp, have become motorized with the development of the automobile trailer, the Wisconsin State Board of Health became active in controlling prostitution about the big scale army maneuvers in that state during August.

State and federal agencies, including army officials, cooperated under special rules to protect the state from any concentration of vice involving the menace of venereal diseases. Under emergency rules, no parking of trailers was permitted without special permit in the encampment area, which covered about 1,000 square miles.

Law enforcement officials of six counties touching on the military area cooperated with the officials during the month, and about thirty state-local enforcement officials were deputized during the period.

Rules adopted prohibited the opening of new tourist camps, dance halls, road houses, food stands or carnivals in the area, the picking up of hitch hikers, and the operating of taxicabs without special permit outside of municipal boundaries in the area.

The board ruled that civilians coming into the military zone, reasonably suspected of having a venereal disease could be inspected or examined by proper medical authorities and, if found to be infected, were to be hospitalized, quarantined or excluded from the area; also that prostitutes should not be permitted in the military zone.

INDIANA PUBLISHES MILITARY MEDICINE NUMBER

The Indiana State Medical Association has devoted its journal for September to military medicine. On the cover appears a picture of Fort Benjamin Harrison with troops in the foreground and a photograph of a patient being removed from an ambulance. Included among the subjects covered in the original articles are "Rational Contribution to National Defense by the Medical Profession" by Elmer F. Straub, Indianapolis; "Early Treatment of Gunshot Wounds and Fractures," Dr. Hiram W. Orr, Lincoln, Neb.; "The Medical Service of the United States Army," Lieut. Col. Paul R. Hawley, Carlisle, Pa.; "The Problem of the Psychopath in Recruit Training of the U. S. Navy," Dr. Emory L. Dravo, Great Lakes; "The Medical Officer from Civil Life," Dr. Larue D. Carter, Indianapolis; "Gas," Elliott H. Parks, Indianapolis; "Aviation Medicine," Dr. Albert M. Mitchell, Terre Haute; "Medical Defense," Dr. Herman M. Baker, Evansville, and "Registration Required," Robinson Hitchcock, Indianapolis. Special articles include one on "Medical Preparedness."

PROGRAM OF THE WISCONSIN STAFF MEETING

The program of the staff meeting of the Wisconsin General Hospital, Madison, October 1, was given over to military preparedness. The following subjects were discussed by members of the medical corps of the Wisconsin National Guard: Col. William F. Lorenz, "The Physician and Selective Service"; Lieut. Col. William J. Bleckwenn, "Organization of the Medical Department of the Army," and Capt. Marc J. Musser, "Functions of the Medical Department of the Army." Captains Frederick J. Pohle, Anthony R. Curreri and Clayton P. Wageman of the medical reserve corps discussed the "Medical Problems encountered in Recent Second Army Maneuvers."

RESERVE OFFICERS IN PHILA- DELPHIA

The official bulletin of the Philadelphia County Medical Society reports that there are about 600 physicians and dentists in the Philadelphia area who are members of the Medical Reserves. There are about seventy-one physicians in the Naval Reserve.

The statement pointed out that many units of the National Guard are not filled up to their required strength and that, as the personnel must be increased at once, more medical officers will be required.

ORGANIZATION SECTION

MEDICAL LEGISLATION

DISTRICT OF COLUMBIA

Changes in Status.—H. R. 8665 has been reported to the House, providing for the issuance of a license to practice chiropractic in the District of Columbia to Lou Davis. H. R. 9284 has passed the Senate, providing for the issuance of a license to practice the healing art in the District of Columbia to Dr. A. L. Ridings.

MEDICAL BILLS IN CONGRESS

Changes in Status.—The conference committee on H. R. 960, extending the classified civil service of the United States, has reached an agreement and has submitted to the House and Senate a report in which it is recommended that the Hatch amendment, paving the way for the appointment of graduates of unapproved medical schools to civil positions in government service, be eliminated. H. R. 8613 has been reported to the Senate, proposing that any person who served as a member of the Army Nurse Corps or of the Navy Nurse Corps during the World War and continuously thereafter until May 13, 1926, and who was, prior to June 20, 1930, separated from said corps by reason of physical disability incurred in line of duty, shall, on her application therefor, be entitled to be placed on the retired list of the Nurse Corps of which she was a member. H. R. 10278 has been reported to the House, proposing that in time of war or during an emergency declared by the President or by Congress the Secretary of War may, in his discretion, dispense with any part of the examination for promotion in the Regular Army of officers of the Medical, Dental and Veterinary Corps, except those relating to physical examination.

Bills Introduced.—S. 4396, introduced by Senator Murray, Montana, and H. R. 10587, introduced, by request, by Representative McCormack, Massachusetts, propose to amend the Selective Training and Service Act of 1940 so as to provide that medical and dental students at recognized medical and dental schools, and interns and resident physicians, surgeons and dentists at recognized hospitals, shall be exempt from training and service under the act, but not from registration, and that any such medical or dental student, intern or resident who is a member of a reserve component of the land or naval forces of the United States shall not be ordered or called to active

duty or into active service in any such forces without his consent, except in time of war. The bills further provide that any man selected for training and service under the Selective Training and Service Act (1) who has been awarded a degree of doctor of medicine or doctor of dental surgery by a recognized medical or dental school, (2) who holds a valid license to practice medicine, surgery or dentistry in any state, territory or possession of the United States or the District of Columbia and is engaged in such practice at the time of his selection, and (3) whose physical and mental fitness for such training and service has been satisfactorily determined shall, in lieu of induction into the land or naval forces of the United States for such training and service, be commissioned as an officer in the Medical Department Reserve, Officers' Reserve Corps, and ordered into the active military service of the United States as provided in the joint resolution approved Aug. 27, 1940, by which the President was authorized to call into active service the National Guard and Reserve components of the Army. H. R. 10606, introduced by Representative Schwert, New York, proposes to enact a "National Preparedness Act of 1940 for Health Education, Physical Education and Recreation in Schools and School Camps." The provisions of the bill, if enacted, will be administered by the United States Commissioner of Education, who is to be authorized to apportion federal grants-in-aid to be made available to the states that develop programs embodying the requirements set forth in the bill, subject to the approval of the Commissioner of Education. A school program, the bill provides, shall include among other things a continuous school health service, not including medical and dental treatment, to determine at least annually the health status of each pupil, to aid in the protection of pupils against communicable diseases, to provide special adjustment and guidance for pupils in need of such services; health supervision to insure safe and sanitary school conditions and processes for healthful living; instruction for all pupils in health and safety, including among other related and essential topics, instruction in nutrition, dental hygiene, first aid, effects of narcotic drugs and alcohol, physical and mental hygiene, and the hygiene of home and family life and such services as will bring all pupils having correctible and remediable defects under the care and treatment of licensed practitioners "or the proper agencies."

WOMAN'S AUXILIARY

Pennsylvania

The auxiliary to the Lackawanna County Medical Society had its annual bridge-luncheon, July 1, at the Scranton Country Club. About 130 members and friends attended, including representatives of the auxiliary to the Lackawanna County dental and pharmaceutical societies. The auxiliary voted a contribution to the American Red Cross for war relief work.—About 100 members and guests of the auxiliary to the Lehigh County Medical Society were entertained at a garden party at the home of Dr. and Mrs. J. Edwin Minner of Egypt, July 9. The proceeds were devoted to the charity fund.

Utah

At the annual meeting of the auxiliary to the Utah State Medical Association, Ogden, August 29 to 31, the attendance was excellent. Presiding at all sessions was Mrs. J. J. Weight of Provo, the president. Dr. G. M. Fister, president of the Utah State Medical Association, gave an address of welcome, followed by an address by Dr. Henry Nelson of Ogden. The guest speaker for the Thursday luncheon was Mrs. V. E. Holcombe, president of the national auxiliary, who spoke in

behalf of the *Bulletin*, the official organ of the auxiliary. The report of the annual national meeting was given by Mrs. Claude Shields. "The First Woman Physician of Utah" by Mrs. John Z. Broun and an address by Dr. Alton Oschner of New Orleans were given at the afternoon session. Later the guests were taken up to Ogden Canyon to the summer home of Mrs. Ezra Rich. A bridge-garden party was held at the home of Mrs. Leslie A. Smith. Friday morning, Dr. James C. Carr, professor of medicine at Northwestern University Medical School, Chicago, gave an interesting account of the life of Dr. Rudolph Virchow, father of modern pathology. At a luncheon, Utah County gave a clever skit "Fadesius in Foodesius," an original comedy on diets. Friday afternoon, Mrs. L. J. Paul of Salt Lake City presented a symposium on public relations, introducing Drs. John Sharp, J. R. Morrell and Ivan Thompson as guest speakers. Mrs. Leslie Merrill spoke on "Health Programs for High Schools." The national president's subject for the day was "Being a Doctor's Wife Is Both an Art and a Career." In the evening, the ladies joined the doctors at a pageant, "Fifty Years of Medicine in Utah County." On Saturday morning the "Do's and Don'ts of Vacationing" was presented by women from Salt Lake County.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Changes in Health Officers.—The newspapers report the following recent changes in health officers:

Dr. Robert Webster Crowell, Mullins, S. C., appointed in Chilton County, succeeding Dr. Samuel D. Sturkie, Clanton, who resigned to join the Virginia State Department of Health with headquarters in Charlottesville.

Dr. Arthur M. Shelamer, Athens, in temporary charge of the Limestone County health unit, succeeding Dr. Frank M. Hall, Athens, who resigned for a year's study at Johns Hopkins School of Hygiene and Public Health.

Dr. Julian W. Davis, O'Donnell, Texas, in charge of Henry County, succeeding Dr. George E. Maddison, who resigned to offer his services to the Canadian army.

Dr. Thomas T. Box, health officer of Washington County with headquarters at Chatham, in charge of Choctaw County with offices in Butler, succeeding Dr. David B. Snelling who went to Greene County.

Dr. William A. Blake, formerly of Blountville, Tenn., succeeded Dr. Box in Washington County.

Dr. Isee L. Connell, Birmingham, appointed in Cleburne County, succeeding Dr. Frank R. Wood, Heflin, whose term expired.

Dr. Eldridge T. Norman, health officer of Marengo County, appointed in charge of Hale County, with headquarters in Greensboro, succeeding Dr. Benjamin M. Drake, who recently resigned.

Dr. Marion L. Shaddix, Phenix City, health officer in Russell County, has been transferred to Clay County in a similar capacity.

ARKANSAS

Ninth Course of Graduate Instruction.—The committee on postgraduate instruction, Arkansas Medical Society, is offering its ninth course of graduate instruction, October 16-17, in cooperation with the University of Arkansas School of Medicine, Little Rock. Guest speakers will be Drs. John M. T. Finney Jr., Baltimore, and Hubert M. Parker, Kansas City, Mo. Dr. Finney will discuss "Appendicitis" and "Diverticula of the Small Intestine" and Dr. Parker, "Calcium Therapy, Indications and Contraindications" and "Management of Symptoms in Patients Who Have Had Several Laparotomies." Other speakers will include:

Dr. Grady W. Reagan, Little Rock, Newer Methods in the Diagnosis and Treatment of Pylonephritis.

Dr. Clyde D. Rodgers, Little Rock, Sterility.

Dr. Barton A. Rhinehart, Little Rock, The Essentials of Normal Nutrition.

Dr. Charles C. Reed Jr., Little Rock, Intravenous Anesthesia with Pentothal Sodium.

Dr. Byron A. Bennett, Little Rock, The Therapeutic Indications for the Use of Hormonal Preparations in Gynecology.

Dr. John N. Compton, Little Rock, The Good and the Bad About Sulfanilamide and Related Drugs.

Refresher courses will be offered concurrently with the postgraduate course. They are intended to be a comprehensive review emphasizing fundamental anatomic, physiologic, pathologic and clinical aspects of the subjects presented. They will be informal, making use of patients and clinical case reports.

CALIFORNIA

Physicians' Bowling Team.—A movement is under way to form a physicians' bowling team, consisting in the beginning of teams made up by members of the Los Angeles Medical Association. The object is, however, to develop a statewide league and a national organization patterned after the American Medical Golfing Association, with annual tournaments in the city in which the American Medical Association has its annual session. Information may be obtained from Dr. Lewis W. Bremerman, 1709 West Eighth Street, Los Angeles.

Society News.—The Los Angeles Surgical Society was addressed, October 11, by Drs. Harold L. Thompson on "Traumatic Lesions of the Bowel"; E. Eric Larson, "Gastric Resection," and Vernon P. Thompson, "The Mechanical Problems of Femoral Neck Fractures." All are from Los Angeles.

—Dr. George P. Landegger, Los Angeles, will discuss "History of Art" before the Los Angeles Physicians' Art Society, October 15, and Mr. Leslie G. Walker, "Painting with Light." —The San Francisco County Medical Society devoted its meeting, October 8, to a discussion on "Can We Get Adequate Nursing Care?" The speakers were Dr. Anthony J. J. Rourke and Marjorie Hart, R.N.; Sally Heitman, R.N., and Helen Reynolds, R.N.

COLORADO

State Medical Election.—Dr. Guy C. Cary, Grand Junction, was chosen president-elect of the Colorado State Medical Society at its annual meeting, September 14, and Dr. William H. Halley, Denver, was inducted into the presidency. Dr. John S. Bouslog, Denver, is the constitutional secretary. The next annual session will be held in Estes Park, the date to be decided later.

DELAWARE

Society News.—The New Castle County Medical Society was addressed in Wilmington, September 17, by Louis Gershenfeld, Pharm.M., Philadelphia, on "Serums, Vaccines and Related Products," and Dr. Joseph R. Beck, Dover, "Statistics on Diphtheria Immunization in Delaware."

State Medical Election.—Dr. Emil R. Mayerberg, Wilmington, was elected president of the Medical Society of Delaware at its annual meeting in September, to succeed Dr. Bruce Barnes, Seaford. He will take office in January. Dr. Charles L. Munson, Wilmington, is the secretary. The next annual session will be held in Wilmington, the date to be decided later.

DISTRICT OF COLUMBIA

Personal.—Col. Norman L. McDiarmid, medical corps, U. S. Army, has been appointed superintendent of Columbia Hospital for Women, Washington, to succeed the late Col. Percy M. Ashburn, who died August 20. Colonel McDiarmid has been stationed in the headquarters of the fourth corps area, Atlanta.

Society News.—Dr. Max M. Strumia, Bryn Mawr, Pa., addressed a meeting of medical and dental officers of the U. S. Navy in Washington, October 7, on "The Preparation and Utilization of Blood Plasma in the Naval Service." —The Medical Society of the District of Columbia was addressed in Washington, October 9, by Dr. Lauritz S. Ylvisaker, associate medical director, Prudential Insurance Company of America, and Mr. Pearce Shepherd, associate actuary of the Prudential, on "The Importance of Heart Disease." The society will be addressed, October 30, by Drs. Hugh H. Young, Baltimore, on "The Use of Radium in Tumors of the Bladder and Prostate" and Arthur C. Christie, Washington, "Diagnosis and Treatment of Cancer of the Pharynx."

GEORGIA

District Meeting.—The Fifth District Medical Society will meet in Atlanta, October 17. The speakers will be Drs. Robert B. Greenblatt, Augusta, on "The Vaginal Smear as a Guide to Estrogenic Therapy"; Robert C. Pendergrass, Americus, "Unusual Lesions of Gastrointestinal Tract" and Richard Torpin, Augusta, "Roentgen Pelvimetry." Dr. Job C. Patterson, Cuthbert, president of the state medical association, will also speak.

IDAHO

Director of Health Resigns.—Dr. Howard L. McMartin, Boise, has resigned as director of public health of Idaho and has accepted a position as director of health of Maricopa County, Ariz.

State Medical Election.—Dr. Paul M. Ellis, Wallace, was chosen president-elect of the Idaho State Medical Association at its annual session, September 13, and Dr. Abram M. Newton, Pocatello, was installed as president. Dr. Franklin B. Jeppesen, Boise, was elected secretary. The next annual meeting will be held in Sun Valley, June 18-21.

ILLINOIS

Hospital News.—The new \$600,000 Lake County tuberculosis sanatorium was dedicated in Waukegan, August 18; Dr. Morris Fishbein, Editor of THE JOURNAL, Chicago, was the principal speaker, using for his subject "Campaign Against the White Plague."

Society News.—Dr. Millard F. Arbuckle, St. Louis, discussed "Diagnosis and Treatment of Lung Abscess" before the Jefferson-Hamilton County Medical Society in Mount Vernon, September 25. —Dr. Joseph E. Schaefer, Chicago, addressed the Macoupin County Medical Society in Carlinville, September 24, on "Lesions of the Mouth." —Dr. Arthur J. Fletcher, Danville, discussed poliomyelitis before the Saline County Medical Society in Eldorado, September 27. —A symposium on diseases of the biliary tract was presented before the Vermilion County Medical Society in Danville, October 3, by Drs. Rollo K. Packard, Percy E. Hopkins and Charles H. Phifer, Chicago. Dr. Edwin S. Hamilton, Kankakee, discussed "Organization of the Medical Profession for National Defense."

Dr. Wendell W. Brown, Collinsville, addressed the Madison County Medical Society in Collinsville, October 4, on "Indications and Applications of X-Ray and Radium Therapy in Gynecology."—At a meeting of the Stephenson County Medical Society in Freeport, October 17, Dr. Charles J. Drucek, Chicago, will speak on "Cancer of the Rectum."—The Whiteside County Medical Society will be addressed in Sterling, November 7, by Dr. Clifford J. Barborka, Chicago, on "Management of Gallbladder Disease."—Dr. James E. Graham, Springfield, discussed "Varicose Veins" before the Adams County Medical Society in Springfield, September 9.

Chicago

New Hygiene Clinics.—Three free social hygiene clinics have been opened in Cook County through funds obtained under the National Venereal Disease Control Act. The clinics are in the Berwyn, Maywood and Robbins health centers. Additional clinics will be opened soon in Cicero, Harvey and Chicago Heights.

Alumni Reunion.—An informal reception and open house will be held, October 16, to honor three new deans of the Chicago colleges of the University of Illinois. They are Dr. Raymond B. Allen, executive dean of the Chicago colleges; Howard M. Marjerson, D.D.S., dean of the college of dentistry, and Earl R. Serles, Ph.D., dean of the college of pharmacy. An invitation is extended to all alumni of the University of Illinois.

INDIANA

Society News.—The Tippecanoe County Medical Society was addressed in Lafayette, September 10, by Dr. Harold S. Hulbert, Chicago, on "Behavior Problems, What Can We Do?"

—Dr. Edwin L. Libbert, Lawrenceburg, addressed the Dearborn-Ohio County Medical Society in Lawrenceburg, June 27, on "Medical Physiotherapy."—The Indianapolis Medical Society will devote its meeting, October 15, to a symposium on tuberculosis with Drs. Charles J. McIntyre, Chester A. Stayton and Frank L. Jennings as the speakers. The society will be addressed, October 22, by Drs. Willis D. Gatch on "Surgical Aphorisms"; J. Neill Garber, "Clinical and Pathologic Aspects of Volkmann's Contractures" and James S. Browning, "Tests of Cardiac Function."

MARYLAND

Semiannual Meeting of State Society.—The Medical and Chirurgical Faculty of the State of Maryland held its semiannual meeting in Annapolis, October 9. Dr. Robert S. G. Welch, Annapolis, vice president, Anne Arundel County Medical Society, gave the address of welcome. Drs. William F. Rienhoff Jr., Baltimore, and William D. Stroud, Philadelphia, discussed "The Jaundiced Patient" and "Cardiology," respectively. Dr. Edward P. Thomas, Frederick, president, Medical and Chirurgical Faculty, also spoke.

Personal.—Dr. Louis B. Flexner, associate in anatomy at Johns Hopkins University School of Medicine, Baltimore, has been appointed research associate in the department of embryology of the Carnegie Institution of Washington in Baltimore, according to *Science*. He will continue to investigate chemical interchanges in mammalian development, making use of artificially radioactive substances in cooperation with the department of terrestrial magnetism of the Carnegie Institution. Herbert A. Pohl, Ph.D., has been appointed research assistant in the department of embryology and Dr. Alfred A. Gellhorn a research fellow. Dr. Ines Lopez Columbo de Allende, during the past year visiting fellow of the Argentine Association for the Advancement of Science at the University of Rochester, has been appointed to a Rockefeller traveling fellowship and will spend the year 1940-1941 in the department of embryology of the Carnegie Institution.

MASSACHUSETTS

Personal.—Dr. Edwin B. Astwood, associate in obstetrics at the Johns Hopkins University School of Medicine, Baltimore, has been appointed assistant professor of pharmacotherapy at Harvard Medical School, Boston. He will also be a member of the staff of Peter Bent Brigham Hospital.

New Publication on Mental Hygiene.—The Massachusetts Society for Mental Hygiene announces that it has started the publication of a quarterly magazine "*The Mental Health Sentinel*," the first issue of which will appear this month. The editorial staff consists of Dr. Henry B. Elkind, Boston, editor; Miss Bernice M. Henderson, associate editor; Dr. Douglas A. Thom, Boston, president of the society; Dr. Clarence A. Bonner, Danvers, and Dr. Harry C. Solomon, Boston.

MICHIGAN

Prizes for Medical Papers.—The Foster Welfare Foundation of Grand Rapids, founded under the will of the late Clara J. Foster of Newaygo, announces the offering of prizes for medical papers on the following terms: Three \$100 cash prizes will be awarded, one each for the hospital staff of Blodgett Memorial Hospital, Butterworth Hospital and St. Mary's Hospital, respectively, all of Grand Rapids. The prize will be awarded to the author or authors of the best medical paper written by a member of the staff of the hospital, provided the staff of such hospital produces at least five medical papers, including the winning paper, which have been accepted for publication by either a national or a state medical journal during the year commencing May 1, 1940, and ending May 1, 1941. Each paper submitted may be written by one or more persons and, in the event that it is written by more than one, the award will be divided proportionately among the authors. Besides the three \$100 prizes mentioned, there will be an additional grand prize of \$100 to be awarded to the writer or writers of the best medical paper produced during said year, and accepted for publication, by members of the staffs of the three hospitals. This prize may be won even though the author's hospital staff has not produced five such medical papers during the year or may be won by the same author or authors and with respect to the same paper which is awarded one of the hospital staff prizes if such hospital staff qualifies by producing five papers. Typewritten copies of each of the papers to be submitted for prizes must be in the hands of a medical committee not later than May 1, 1941, including the papers, if any, not submitted for prizes but which are necessary in order to qualify a particular hospital staff as having written five medical papers accepted for publication during the year. The local medical committee will comprise three doctors, one from each hospital staff, which shall be appointed by the president of the Kent County Medical Society, subject to the approval of the board of trustees of the Foster Welfare Foundation. The duty of this committee will be to administer the work of collecting the papers and arranging the details of awarding the prizes. The committee, however, will not act as judges, and its members will be eligible to compete for the prizes. The judges to pass on the papers will be appointed by the trustees of the Foster Welfare Foundation. The judges will be doctors not residing in Grand Rapids and preferably those on university staffs. A dinner will be held in June 1941, at which time the prizes will be awarded, together with a suitable medal or certificate to be given to each prize winner.

MINNESOTA

Clinical Program of Alumni Association.—The Minnesota Medical Alumni Association will conduct a one day clinical program, October 25, the day preceding the university homecoming celebration. Beginning at 9 o'clock in the morning there will be presented in the Eustis Amphitheatre of the University Hospitals a series of half hour demonstrations and lectures by members of the faculty and by members of the class of 1920, which is holding its twenty year celebration on the same day. The speakers will include Drs. Henry E. Michelson, Thomas J. Kinsella, Adalbert L. Dippel, Leo G. Rigler, George E. Fahr, Minneapolis; Siegfried F. Herrmann, Tacoma, Wash., and Ellexious T. Bell, Minneapolis. At the conclusion of the clinical program, the annual meeting of the association will be held under the leadership of Dr. Harold G. Benjamin, Minneapolis, president. The program will conclude with a luncheon.

MISSOURI

Personal.—Dr. Katherine Bain, St. Louis, has been appointed director of the division of research in child development in the U. S. Children's Bureau, it is reported. She will supervise research projects which the bureau has under way in various medical schools, dealing particularly with rickets and the newborn. Her headquarters will be in Washington, D. C. Dr. Bain graduated at Washington University School of Medicine, St. Louis, in 1925.

NEW JERSEY

Autumn Tuberculosis Meeting.—The New Jersey Tuberculosis League will hold its annual fall meeting at Plainfield, October 25, with the following speakers: Emil Frankel, Trenton, "The Sanatorium" in the New Jersey Tuberculosis Program"; Dr. Allen W. Freeman, Baltimore, "What Principles Should Guide the Programs of Tuberculosis Associations in the Light of the Epidemiology of Tuberculosis?" and Dr. Charles S. Prest, Brooklyn, "Mass Testing of the Adult Population."

NEW YORK

Society News.—Dr. William Thalheimer, New York, addressed the Medical Society of the County of Westchester, White Plains, September 17, on "The Use of Human Serum in Combating Infectious Diseases and in Treating Shock."—Dr. Arthur J. Wallingford, Albany, addressed the Dutchess County Medical Society, September 11, on gynecologic problems.—Dr. James P. Leake of the U. S. Public Health Service, Washington, D. C., addressed the Medical Society of the County of Nassau, Garden City, September 24, on "Communicable Disease Control."—The New York State Association of Public Health Laboratories will hold its mid-year meeting at the division of laboratories and research, State Department of Health, Albany, November 1.—Dr. Samuel A. Levine, Boston, addressed the Rochester Academy of Medicine, October 1, on errors in cardiac diagnosis.

New York City

Dr. Rappleye Named Commissioner of Hospitals.—Dr. Willard C. Rappleye, dean of the College of Physicians and Surgeons of Columbia University, has been appointed commissioner of hospitals, succeeding Dr. Sigismund S. Goldwater. Dr. Rappleye has been granted a fifteen months leave of absence from his university position. He was to begin his new work October 2. Born in Marinette, Wis., in 1892, Dr. Rappleye graduated at Harvard Medical School, Boston, in 1918. He was chief of clinical laboratories and instructor in biochemistry at the University of California, 1919-1920, and director of hospitals there in 1921. He was superintendent of the New Haven Hospital from 1922 to 1926 and professor of hospital administration at Yale University, 1922-1925; director of study, Commission on Medical Education, 1925-1932. He has been dean at Columbia since 1931 and professor of medical economics since 1932; acting dean of the School of Dental and Oral Surgery at Columbia, 1933-1934, and dean since 1934. Since 1933 Dr. Rappleye has been director of the New York Post-Graduate Medical School and Hospital. Dr. Goldwater recently resigned as commissioner of hospitals to devote full time as head of the Associated Hospital Service.

OHIO

Hospital News.—The Cleveland City Hospital is offering its third lecture course for practicing physicians during October. Lectures are held Mondays, Wednesdays and Fridays, each followed by a question period. Among the subjects to be covered are patch tests in contact dermatitis, how to give insulin, paranasal sinusitis, nonallergic asthma, various phases of heart disease, chemotherapeutic drugs, anemias and use of testosterone propionate.

Society News.—Dr. Roy R. Grinker, Chicago, will address the Academy of Medicine of Cincinnati, October 15, on "The Interrelation of Neurology, Psychiatry and Psycho-Analysis." Dr. Edwin P. Alyea, Durham, N. C., will be the speaker, October 22, on "Chemotherapy in Nonspecific Urinary Tract Infections."—Dr. Warren H. Cole, Chicago, addressed the Montgomery County Medical Society, Dayton, October 4, on "Diseases of the Gallbladder."

Veteran Physicians Honored.—Six Lorain County physicians who have practiced more than forty-five years were honored at a dinner given by the Lorain County Medical Society, Lorain, September 10. They were Drs. Olney B. Monosmith and William E. Wheatley, Lorain; George E. French and Austin S. McKittrick, Elyria; George C. Jameson, Oberlin, and Frank B. Gregg, Wellington.—Dr. William B. Litten, West Bedford, was the guest of honor at a reception recently celebrating his sixtieth year of practice.

OKLAHOMA

Personal.—Dr. James T. Bell, Woodward, has been appointed director of the department of maternal and child health in the state department of health to succeed Dr. Paul J. Collopy, Oklahoma City, who resigned to join the staff of the Children's Hospital, Seattle, Wash.—Dr. Louis N. Dakil, Mayetta, Kan., has been appointed physician of the Quz paw Indian Agency with headquarters in Miami, succeeding Dr. Joseph H. Coogan, transferred to an agency in Nevada.

Another Medical Supplement.—The *Daily Oklahoman*, Oklahoma City, published a medical supplement, September 22, in cooperation with the Oklahoma County Medical Association. The supplement was published in tabloid form and consisted of twenty pages, the front page being devoted to an original drawing in color. In an editor's note it was stated that "For ethical reasons it has been impossible to use the names of

various doctors on many stories appearing in this section. On others, more general in scope, use of names has been permitted. In every instance the material has been prepared by competent authorities in the various fields." A similar supplement was published in September 1939.

PENNSYLVANIA

Society News.—Speakers at a meeting of the Clearfield County Medical Society, Philipsburg, September 26, were Drs. George P. Müller, Philadelphia, on "Treatment of Surgical Complications of Peptic Ulcer"; Edward L. Bortz, Philadelphia, "Modern Treatment of the Diabetic," and William Raymond McKenzie, Baltimore, "Cancer of the Larynx."—Herbert Koepp-Baker, associate professor of speech, Pennsylvania State College, State College, addressed the Lycoming County Medical Society, Williamsport, September 13, on "Speech Disorders."

Philadelphia

Sale of Raw Milk Banned.—Sale of unpasteurized milk for human consumption was banned in Philadelphia, October 1, under a new regulation of the board of health. Certified milk is excepted. About 8,000 quarts of raw milk is sold daily in Philadelphia out of a total of 800,000 quarts consumed. It is produced on twenty-one model farms under supervision of a raw milk commission set up four years ago, according to a newspaper account. Under the new plan they will be compelled to pasteurize the milk if it is sold in Philadelphia.

Society News.—A doctors' and dentists' night was observed by the Philadelphia County Medical Society, October 9, with Drs. Lester W. Burket and Robert H. Ivy as the speakers on "The Equal Importance of Mouth Lesions to Physicians and Dentists" and "Diagnosis of Lesions of the Mouth and Jaw" respectively. Both speakers are also dentists. The meeting was arranged in collaboration with the Philadelphia County Dental Society.—Speakers at a meeting of the Obstetrical Society of Philadelphia, October 3, were Drs. Clarence C. Briscoe and Robert A. Wilson, Brooklyn, on "Emergency Control of Postpartum Hemorrhage: Experience with the Supplementary Technic" and William G. Leaman Jr., "Some Cardiological Factors of Importance in Obstetric Practice."—Dr. John B. Flick addressed the Philadelphia Academy of Surgery, October 7, on "Lobectomy for Chronic Pulmonary Suppuration."

SOUTH CAROLINA

District Meeting.—A semiannual meeting of the Second District Medical Society was held in Columbia recently with the following speakers: Drs. Paul H. Ringer, Asheville, N. C., on "General Management of Tuberculosis"; David S. Asbill, Columbia, "Concretions in the Nose and Throat," and Francis E. Zemp, Columbia, "Helpful Points in Determining Heart Disease."

Society News.—The Fairfield County Medical Society, which had been inactive for several years, was reorganized at a recent meeting in Winnsboro. Officers elected included Drs. John C. Buchanan Jr., president; Samuel Lindsay, vice president, and Charles S. McCants, secretary.—Lieut. Col. Clyde C. Johnston, surgeon of the Eighth Division, U. S. Army, Fort Worth, Texas, addressed the Columbia Medical Society, Columbia, September 9, on "Military Medicine."

Personal.—Dr. Joseph H. King, Summerton, has been appointed health officer of Chester County to succeed Dr. Yeadon M. Hyer, recently transferred to Hampton and Alledale counties.—Dr. Lloyd W. Luttrell, Spartanburg, has been named health officer of Pickens County.—A portrait of Dr. Jane Bruce Guignard, Columbia, was presented to the Columbia Hospital, September 24, by her patients. Dr. Guignard was graduated from the Woman's Medical College of Pennsylvania in 1904 and has practiced in Columbia since 1905.

WASHINGTON

New Health Officers.—Dr. Lawrence E. Foster, formerly of Monticello, Ill., has been appointed head of a new health unit in Jefferson County, with headquarters in Port Townsend.—Dr. Ralph M. DeBit, Kennewick, has been appointed health officer and county physician of Benton County, succeeding the late Dr. LeGrand Spaulding. Dr. Russel L. Baker, White Salmon, has been appointed health officer for Klickitat County.

Society News.—Speakers before the King County Medical Society, Seattle, September 16, were Drs. Kenneth K. Sherwood, on "Medical Aspects of Postoperative Complications"; John E. Nelson, "Appraisal of the Tuberculin Tests," and Pius A. Rohrer, "Renal Tuberculosis—A Follow-Up Study."

All are from Seattle.—A round table discussion of cancer was presented at a meeting of the Spokane County Medical Society, Spokane, September 12, by Drs. Horace J. Whitacre, Tacoma, as interrogator; James M. Nelson, Spokane, discussing surgery; Bernard D. Harrington, Tacoma, radiology; George A. C. Snyder, Spokane, pathology, and Donald G. Corbett, Spokane, urology.

WISCONSIN

Personal.—Dr. Jefferson F. Klepfer, acting superintendent of the Central State Hospital for the Insane, Waupun, since the death of Dr. William A. Deerhake, April 10, has been appointed superintendent.

Society News.—Drs. George B. Noyes, Centuria, and Anton N. Nelson, Clear Lake, addressed the Polk County Medical Society, Amery, August 15, on "Inguinal Hernia in Small Infants" and "Speech Defects" respectively.—Drs. Robert S. Baldwin and Stephen Epstein, Marshfield, addressed the Trempealeau-Jackson-Buffalo Counties Medical Society in Blair, August 22, on "Management of Diabetes" and "Common Skin Diseases" respectively.—Drs. Henry A. Romberg and Reuben H. D. Bitter, Oshkosh, addressed the Winnebago County Medical Society, Oshkosh, September 5, on military medical service.

ALASKA

Dr. Worley Transferred to Minneapolis.—Dr. James F. Worley, senior surgeon, U. S. Public Health Service, medical director of the Alaska division of the Indian Medical Service, Juneau, has been transferred to Minneapolis as medical director of district number 1, comprising the states of Michigan, Wisconsin, Minnesota, Iowa, Nebraska and North and South Dakota.

HAWAII

Society News.—Dr. Theodore L. Althausen, San Francisco, addressed the Hawaii County Medical Society, Hilo, August 6, on "Clinical Management of the Disturbance of Carbohydrate Metabolism in Hyperthyroidism." In July Dr. Ludwig A. Emge, San Francisco, gave a series of lectures on obstetrics under the auspices of the bureau of maternal and infant hygiene, and Dr. Isidor S. Ravdin, Philadelphia, lectured recently on "Gastric and Duodenal Ulcers," "Problems of the Biliary Tract" and "Preoperative and Postoperative Treatment." Dr. Ravdin also held a surgical clinic at the Hilo Memorial Hospital.

GENERAL

Aero Medical Association.—The twelfth annual meeting of the Aero Medical Association of the United States will be held in Memphis, Tenn., October 25-27, with headquarters at the Hotel Peabody. Among papers announced in the preliminary program are:

Dr. Walter M. Bartlett, Benton Harbor, Mich., The Use of Combined Electrocardiography, Electroretinography and Cardioscopy in the Early Recognition of Heart Disease as Especially Applied to the Selection of Pilots.

Capt. Otis A. Benson Jr., U. S. Army, Data of Experimental Work from the Metabolism Laboratory of the Mayo Clinic.

Dr. Edward J. Van Lier, Morgantown, W. Va., The Effect of Anoxia on the Digestive Processes.

Association of Medical Colleges.—The fifty-first annual meeting of the Association of American Medical Colleges will be held at the University of Michigan, Ann Arbor, October 28-30. The speakers will include:

Dr. Willard C. Rappleye, New York, The Internship.

Dr. James D. Bruce, Ann Arbor, The Expanding Phases of Postgraduate Medical Education.

Donald E. Cummings, B.S., Denver, Industrial Hygiene Instruction for Medical Students.

Dr. Burton D. Myers, Bloomington, Ind., Teaching of Anatomy.

Dr. Paul D. Lamson, Nashville, Tenn., Teaching of Pharmacology.

Dr. Linn J. Boyd, New York, Some Observations on the Teaching of Pharmacology.

George H. Smith, Ph.D., New Haven, Conn., Teaching of Bacteriology.

Dr. George E. Wakerlin, Chicago, A Plan for the Protection of Medical Research.

Society News.—Dr. Abraham R. Hollender, Miami Beach, Fla., was chosen president-elect of the American Congress of Physical Therapy at the annual meeting in Cleveland, September 2-6, and Dr. Nathan H. Polmer, New Orleans, was installed as president. The following were elected vice presidents: Drs. Fred B. Moor, Los Angeles; Kristian G. Hansson, New York; Miland E. Knapp, Minneapolis; Walter S. McClellan, Saratoga Springs, N. Y., and Herbert Worley Kendall, Dayton, Ohio. Dr. Richards Kovacs, New York, is the secretary. The annual awards of merit were presented to Drs. Hollender; George W. Crile, Cleveland; Disraeli W.

Kobak, Malcolm T. MacEachern and William F. Petersen, Chicago; Horatio B. Williams, New York, and Charles F. Kettering, Sc.D., Dayton, Ohio, general manager of the research laboratories of the General Motors Corporation and founder of the Kettering Department of Medical Research at the Miami Valley Hospital, Dayton.

American Dietetic Association.—At the annual meeting of the American Dietetic Association at the Hotel Pennsylvania, October 20-24, the program will include the following medical papers:

Dr. Eugene F. Du Bois, New York, Fewer and Better Diets.

Dr. Carroll E. Palmer, U. S. Public Health Service, Appraising Vitamin Status from the Standpoint of Normal Nutrition.

Dr. Norman H. Jolliffe, New York, Recent Advances in Clinical Applications of the B Vitamins.

Dr. Abraham H. Aaron, Buffalo, Diet in Diseases of the Digestive Tract.

Dr. Dana W. Atchley, New York, Water Metabolism.

Dr. John D. Stewart, Boston, Nutritional Care of Surgical Patients.

Dr. Herbert Pollack, New York, What the Dietitian Should Know About Clinical Laboratory Methods.

Dr. William Schmidt, New York, Nutritional Deficiencies of Adolescence.

Dr. William S. Langford, New York, Psychological Aspects of Feeding in Early Childhood.

Changes in Status of Licensure.—The New York State Board of Medical Examiners has recently reported the following action:

Dr. Irving Klinger, New York, license suspended, July 19, for one year.

Dr. Nicholas A. Tonis, New York, license suspended, July 19, for one year.

Dr. Emanuel L. Stammer, Jamaica, license suspended, July 19, for one year.

The State Medical Board of Ohio has reported the following action:

Dr. Reuben B. Jackson, Nashville, Tenn., Ohio license based on reciprocity with Tennessee revoked, July 2, following his conviction for violation of the federal narcotic laws.

Dr. Weah N. Sherrill, Cincinnati, license revoked, July 2, for conviction of a felony and violation of the federal narcotic laws.

The Wisconsin State Board of Medical Examiners reports the following action:

Dr. Elgie Kraut, Lancaster, license restored July 9.

Conference on Applied Nuclear Physics.—The American Institute of Physics in cooperation with the Massachusetts Institute of Technology will hold a Conference on Applied Nuclear Physics at the Institute in Cambridge, Mass., October 28 to November 2. The activities will be divided into separate sessions on applications to biology, chemistry, radiology, metallurgy, geology and general sessions relating to the production and use of radioactive and stable isotopes and the protection of workers from radiation. Of interest to physicians will be sessions on "General Aspects of Cancer Therapy" and "Radium and Roentgen Therapy" on Tuesday, October 29; and "Neutron and Artificial Radioactivity Therapy" on Thursday, October 31; "Dosage Measurements" and "Radiology" on Friday, November 1. Robley D. Evans, Ph.D., Massachusetts Institute of Technology, is chairman of the program, and members include Gioacchino Failla, D.Sc., of Memorial Hospital for the Treatment of Cancer and Allied Diseases, New York, and Ernest O. Lawrence, Ph.D., of the University of California, Berkeley.

Deaths in Other Countries

Dr. Julius Wagner-Jauregg, winner of the Nobel Prize in 1927 for his work in the use of malaria fever in treating paresis, died in Vienna, October 1, aged 83. Born in Wels, Upper Austria, March 7, 1857, Dr. Wagner-Jauregg made his medical studies in Vienna, receiving his degree of doctor in 1880. He was connected with the department of experimental pathology at Vienna from 1876 to 1882 and with the clinic in psychiatry from 1883 to 1889. He served as extraordinary professor of neurology and psychiatry in Graz from 1889 to 1893. In the latter year he returned to the University of Vienna as professor, serving until 1928 when he reached the retirement age. In 1887 there appeared his first work on the action of febrile diseases on the psychoses in which he recommended particularly the use of malaria. In 1917 he began his malarial injections for the treatment of progressive paralysis and other psychoses. His contributions to medical literature were numerous, including "Myxedema and Cretinism," a "Text-book of Organotherapy" and "Prevention and Treatment of Progressive Paralysis by Malaria Therapy." In 1938 an award of \$1,000 and a medal were presented to Dr. Wagner-Jauregg by the Committee on Research in Syphilis, an American committee, through the Austrian consul general at a special meeting in New York. In his honor, the name of the Vienna Neurologic Clinic was changed to the Wagner-Jauregg Clinic.

CORRECTIONS

Number of Doctors in Georgia.—In a medical economic abstract in the Organization Section of *THE JOURNAL*, September 28, page 1108, it was stated that in Georgia for the state as a whole there is one physician to 1,560 of population. According to the 1940 American Medical Directory, Georgia has a population of 3,073,000. The number of physicians is 2,825, thus giving Georgia one physician to 1,088 of population.

Number of Deaths from Asphyxiation.—In the article by Beck, Schulze and Suter entitled "Carbon Monoxide—A Domestic Hazard," in *THE JOURNAL*, July 6, an estimate of the number of deaths from asphyxia occurring annually in the United States was given as about 50,000. Mr. A. D. Battey, statistician of the National Safety Council, Inc., in Chicago, writes that, based on the U. S. Census Bureau Reports for 1938, it would seem that the total of accidental and suicidal deaths which might be classified as asphyxiation was in the neighborhood of 9,500, and if to this was included also the cases of drowning, the grand total would be only about 18,000. Dr. Beck states that he quoted the foregoing number from the *Ohio Health News* of May 1, 1937. A reply to an inquiry addressed to the Ohio State Department of Health stated that it was unable from the files to justify the statement which had been made in the *Ohio Health News* and that the persons who were responsible for the editing of that particular issue are no longer connected with the Ohio State Department of Health.

Government Services**Wellcome Prize Awarded to Captain Johnson**

The 1940 award of the Sir Henry S. Wellcome gold medal and a cash prize of \$500 have been made to Captain Lucius W. Johnson, medical corps, U. S. Navy. Competitors from the various branches of the government services were invited to present essays on the subject "Medical and Sanitary Care of the Civilian Population Necessitated by Attacks from Hostile Aircraft." The award will be presented at the annual meeting of the Association of Military Surgeons in Cleveland, October 10-12, and the prize essay will be published in the *Military Surgeon*, the official publication of this association. Captain Johnson's contributions to medical literature have been numerous. His awards have included the Navy Cross for relief work in Santo Domingo in 1930 and the Kober Prize and Lectureship on the subject of plastic surgery in 1936. Captain Johnson is under orders to serve as commanding officer of the navy's first mobile base hospital. Recently his duty has been to serve the bureau of medicine and surgery in an advisory capacity on hospital construction.

Microfilm Service of Army Medical Library

A new microfilm service has been established in the Army Medical Library in Washington, D. C. It will be conducted on a nonprofit basis solely for making the extensive medical literature collections of the Army Medical Library available to research workers who are unable to come in person to consult them. The library cooperates by providing the necessary space for the work and by supplying the publications from which the microfilm copies are made. The only cost to the user is for the actual labor and materials required in making and distributing the microfilm copies. The photographic copies on moving picture film of the separate articles in the periodicals are made at 30 cents for each complete article not exceeding thirty pages in length and ten cents for each succeeding ten pages or fraction thereof. A pamphlet describing the service and also containing the latest list of the approximately 4,000 medical and related periodicals currently received by this library will be sent to those desiring to avail themselves of this service. In addition to medical periodicals the library also possesses an extensive collection of manuscripts and incunabula of which microfilm copies may be obtained. Requests should be made to Microfilm Service, Army Medical Library, Seventh Street and Independence Avenue S.W., Washington, D. C. The new service was financed by a group of "Friends of the Army Medical Library." For nearly three years microfilm copying from the medical collections of the library has been conducted by Biblioform Service, a nonprofit agency having its headquarters in the library of the U. S. Department of Agriculture.

Foreign Letters

LONDON*(From Our Regular Correspondent)*

Aug. 31, 1940.

The Use of Sulfonamide Derivatives in the Army

The War Office has issued a memorandum on the use of the sulfonamide derivatives for the guidance of army medical officers, which, however, is of wider interest, for it has been compiled by the leading experts of the day and is the last word on the subject. It is recommended that sulfapyridine should be given in gonorrhea, cerebrospinal fever, pneumococcal infections, staphylococcal septicemia and gas gangrene. But as supplies are not unlimited, economy should be observed. Sulfanilamide should be the drug of choice in the prophylaxis of wound infection and the treatment of erysipelas, cellulitis, meningococcus carriers, the acute phase of wounds known to be infected with hemolytic streptococci, follicular tonsillitis, otitis media and *Bacillus coli* urinary infections. But sulfanilamide is inactive against all pneumococci excepting type III and has little action on staphylococci. The principle of effective treatment is to obtain a high blood concentration as rapidly as possible and to maintain this for a time. As the drugs are rapidly excreted, administration should be four hourly day and night. For maintaining a steady blood concentration the oral route is the best and should ordinarily be followed. But when swallowing is impossible, when gastric upset prevents absorption and in neglected cases in which no time must be lost a soluble preparation for injection is valuable. For established or developing infections, courses of treatment should seldom exceed ten days. A further course should be prescribed only in exceptional circumstances and with precautions against granulocytopenia. As a rule when infection is amenable to these drugs the result is rapid.

**INFECTIONS DUE TO STREPTOCOCCI AND
GAS GANGRENE BACILLI**

The earlier treatment is begun the more likely is it to prevent or control an acute infection, but benefit can be expected even in established infections. A prophylactic course of sulfanilamide should be given to all wounded persons who there is reason to fear may have septic infection or gas gangrene. This should be started as soon as possible and continued for at least four days to protect the patient against the risk of later infection by streptococci in the hospital. Prophylactic treatment may be administered orally or by local application to the wound. For established infections sulfanilamide or sulfapyridine may be used. For prophylaxis the first dose should be 1.5 Gm. of sulfanilamide. Two hours later four hourly administrations of 0.5 Gm. should begin and they should be continued for four days. If it is feared that gas gangrene is already beginning, the first two doses should be doubled.

For the treatment of gas gangrene and severe streptococcal infections the first dose of sulfanilamide or sulfapyridine should be 2 Gm. Subsequent doses, starting two hours later and continuing at four hourly intervals, should be 1 Gm. After two days, as the condition improves, the interval may be prolonged, but not to more than six hours for several days. After the temperature becomes normal small doses (3 Gm. daily) should be continued for three or four days.

MENINGOCOCCIC INFECTIONS

Groups I and II meningococci are equally susceptible to sulfonamide treatment. Early treatment and the maintenance of a concentration of 5 mg. per hundred cubic centimeters of the drug in the cerebrospinal fluid for the first three days and slightly less for a further five or six days is necessary. As

long as administration continues the intake of fluids should be approximately 4 pints (2,000 cc.) daily. Sulfapyridine is slightly more effective than sulfanilamide and has the advantage of being active also against pneumococci. The total dosage in the twenty-four hours should be 8 Gm. and in extreme cases up to a maximum of 10 Gm. On starting treatment the total twenty-four hour dose should be given in the first two administrations; it should then be given in equal doses every four hours. This is done for two or three days, after which the dose is gradually reduced over the next six days to 2 or 3 Gm. daily. In cases of vomiting or difficulty in swallowing, soluble sulfapyridine 1 Gm. should be given by intramuscular injection. In fulminating cases the same should be given plus an intravenous injection of 1 Gm.

PNEUMOCOCCIC INFECTIONS

In lobar pneumonia 5 Gm. of sulfapyridine should be given in the first twelve hours in lots of 2 Gm., 2 Gm. and 1 Gm. every four hours. This is followed by 1 Gm. every four, six or eight hours according to response. When vomiting renders absorption inadequate, soluble sulfapyridine 1 Gm. should be injected intramuscularly every four hours. For pneumococcic meningitis the procedures and dosage are the same as for meningococcic meningitis. It should be remembered that with a frankly purulent focus the drug is inactive and that the common causes of pneumococcic meningitis—otitis and mastoiditis—must be looked for and drained.

A Suspicious Use of Hospital Ships Not to Be Accepted

The repeated attacks on hospital ships, despite distinctive and unmistakable markings, has been described previously. Failure to respect the Red Cross has now been followed by an attempt to misuse it as a help in waging war. Through the Swiss government the British government has received notice that the German government proposes to use vessels distinguished by Red Cross markings for the purpose of rescuing airmen shot down into the sea. The British government has replied that, while it is willing to accord to hospital ships the immunities conferred on them by the Red Cross conventions, their use in a manner calculated to interfere with the conduct of naval and military operations cannot be admitted, especially in view of the attitude adopted toward British rescue boats saving both British and German airmen and the deliberate and flagrant attacks on British hospital ships. On July 12 the British government addressed a protest to Germany, through the medium of the United States government, on many deliberate attacks on British hospital ships, including the actual sinking of three, and no reply was received from the German government. The British government does not place its own boats, used for rescuing airmen, under the Red Cross although they have been repeatedly attacked. It does not feel justified in admitting the German pretensions in respect of vessels the character and function of which are in any case open to the gravest suspicion. It is calculated that six German airmen are brought down daily in the sea. For their rescue the Germans want to be allowed immunity for sixty-four so-called hospital ships.

Lung Injury in Intact Thorax

Though lung injury in intact thorax is familiar as a possibility to most surgeons, it has received little notice in surgical literature; it is often not diagnosed and is not mentioned in recent books on athletic injuries. Probably the first case recorded in English is that reported in the *Dublin Journal of Medical Science* by the surgeon R. W. Smith. A man was knocked down by a train, which passed over his body. He was admitted to the hospital with intense dyspnea and emphysema at the root of the neck. There was no hemoptysis and he died

three quarters of an hour later. The necropsy showed collapse of the right lung with extensive pneumothorax. A large quantity of blood was found around the roots of the great vessels and three lacerations in the substance of the lung, but no tear of the pleura was demonstrated. There were no fractured ribs. In the current number of the *British Journal of Surgery* Martin Fallon has reported the following case:

A medical student, aged 24, was knocked down three times in a boxing contest. An hour after the fight he felt sore in the small of the back and thought he had "pulled" a muscle. He went to bed but the pain prevented sleep and was aggravated by hiccup. On the following day he was strapped, which made him feel easier. On the third day after the fight he coughed up blood clot and was afraid to cough again. He was then seen by Fallon, who found only some bruising over the left lower ribs in front. Examination of the lungs was negative. On the following day he coughed up more dark clot. A roentgenogram showed a cavity containing fluid in the lower lobe of the left lung. No further hemorrhage occurred but yellowish green sputum was coughed up freely. Eleven days after the injury the cavity was smaller and the fluid had gone, and eighteen days afterward the cavity was barely distinguishable. Recovery was complete. As to the mechanism of this injury, it has been suggested by Gosselin that compression of the lung causes instinctive closure of the glottis, making it impossible for the pulmonary sponge to empty. The lung then bursts as a solid mass, like the spleen or liver.

Sir J. J. Thomson

Sir J. J. Thomson, F.R.S., the greatest living British physicist, the discoverer of the electron, has died at the age of 83 years. He was master of Trinity College, Cambridge, and professor of physics in the university. The Cavendish professorship was occupied in succession by Clerk Maxwell, Rayleigh, Thomson and Rutherford. No similar position was ever held by four men of such great and varied genius. In the early years of his professorship, which he attained at the early age of 27, Thomson was largely occupied in consolidating the electromagnetic theory left by Clerk Maxwell in his classic treatise. In 1893 he published "Recent Researches in Electricity and Magnetism," a kind of sequel to Maxwell's treatise. He was convinced that the next great advance in our knowledge of the relation between electricity and matter would be derived from a study of the phenomena which accompany the discharge of electricity through gases. He persisted in seeking evidence for his view that the carriers of the current in these discharges were positively and negatively charged ions formed by the disruption of the molecules of the gas. After the discovery of the x-rays in 1895 by Roentgen the mechanism of gaseous conduction was soon unraveled. But this was only the fringe of the matter. The researches of Hittorf, Crookes and others had shown that in high voltage electric discharges in rarefied gases radiation, called cathode rays, emanated from the negative pole and had various interesting properties. Among these it caused the walls of the glass bulbs used to glow with a greenish yellow light. There was some controversy as to the nature of this radiation. Thomson showed that it was a material projection of electrified atoms from the negative pole. He measured not only the speeds of the particles but also the proportion which the mass of a particle bears to its electric charge. The mass was proved to be a minute fraction of that of a hydrogen atom. This was a great advance, for the chemical atom had stood for nearly a century as an indivisible unit. It now appeared that there was a more fundamental unit—an atom of electricity, a constituent of all chemical atoms. This he originally called a corpuscle, later an electron. Thus he initiated the great revolution in modern physics and radio and photo-electricity.

Deaths

Thomas Hugh Scott, Oklahoma City; Central Medical College of St. Joseph, Mo., 1903; was commissioned as a passed assistant surgeon in the reserve of the United States Public Health Service Sept. 1, 1919, was promoted to surgeon, Nov. 19, 1919, and on March 17, 1921, was promoted to senior surgeon; on June 10, 1922, was detailed to the United States Veterans Administration and on July 25, 1922, was promoted to the rank of assistant surgeon general; commission expired on March 15, 1923, and on March 16, 1923, was given a commission as senior surgeon; was placed on inactive status, June 6, 1924, while still serving on detail with the Veterans Administration, and official status with the public health service ceased on that date; commission automatically expired March 15, 1928; for many years medical officer in charge of the Veterans Administration Facility, Hines, Ill.; aged 61; died, August 31, of cerebral hemorrhage.

Franklin Randolph Wright * Minneapolis; University of Minnesota College of Medicine and Surgery, Minneapolis, 1894; an Affiliate Fellow of the American Medical Association; clinical assistant in surgery and dermatology at his alma mater from 1896 to 1902, clinical instructor of dermatology and genito-urinary diseases from 1902 to 1909, assistant professor of genito-urinary diseases from 1909 to 1920, assistant professor in charge, division of urology from 1915 to 1920, associate professor and director, division of urology from 1920 to 1936 and since 1936 associate professor of urology emeritus; member of the American Urological Association; fellow of the American College of Surgeons; urologist to St. Barnabas Hospital; aged 74; died, August 1, of coronary thrombosis, hypertension and arteriosclerosis.

George W. Jacoby * New York; Friedrich-Wilhelms-Universität Medizinische Fakultät, Berlin, Prussia, 1877; Bellevue Hospital Medical College, New York, 1877; member and past president of the American Neurological Association; past president of the New York Neurological Association; consulting neurologist to the Lenox Hill and Beth Israel hospitals and the New York Infirmary for Women and Children; on the consulting staff of the Craig Colony for Epileptics; author of "Child Training as an Exact Science" in 1914 and "Physician, Pastor and Patient" in 1936; aged 83; died, September 11.

Allan Stuart * Medical Inspector, Commander, U. S. Navy, retired, Chatham, Mass.; Medical College of the State of South Carolina, Charleston, 1889; veteran of the Spanish-American War; entered the navy in 1900 and retired Oct. 1, 1923, on own application after thirty years' service; aged 75; died, August 18, in the United States Naval Hospital, Chelsea, of adenocarcinoma of the prostate.

George Barrow Worthington, San Diego, Calif.; Cooper Medical College, San Francisco, 1904; an Affiliate Fellow of the American Medical Association; fellow of the American College of Physicians; past president and secretary of the San Diego County Medical Society; served during the World War; at one time county health officer; aged 62; died, August 14.

Mathilde Loth * New York; Yale University School of Medicine, New Haven, Conn., 1922; on the staff of the Babies Hospital; pediatrician to the Vanderbilt Clinic; instructor in pediatrics at the Columbia University College of Physicians and Surgeons; aged 44; died, August 29, in the Mount Sinai Hospital of carcinoma of the breast with metastases.

Napoleon Strock Johnson, Clanton, Ala.; Medical College of Alabama, Mobile, 1901; member of the Medical Association of the State of Alabama; vice president of the Alabama Association of Railroad and Industrial Surgeons; formerly member of the city council; served during the World War; aged 57; died, August 30, of carcinoma of the bladder.

Fred E. Thompson, Detroit; Hahnemann Medical College and Hospital, Chicago, 1902; at one time city physician; fellow of the American College of Surgeons; formerly on the staff of St. Joseph's Mercy Hospital; aged 69; died, August 13, at his summer home at Lake of Bays, Ont., Canada, of coronary thrombosis and bronchopneumonia.

Fred L. Burdon, London, Ont., Canada; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1888; L. R. C. S., L. R. C. P., Edinburgh, and L. R. F. P. & S., Glasgow, Scotland, 1893; formerly member of the board of health and board of education; aged 85; died, August 26, in St. Joseph's Hospital.

Herman Theodore Schlegel * Wausau, Wis.; Chicago College of Medicine and Surgery, 1909; member of the American Academy of Ophthalmology and Otolaryngology; served

during the World War; aged 70; died, August 9, in the Memorial Hospital of acute myocarditis and cholelithiasis.

Arthur Augustus Whittemore, Wishek, N. D.; Minneapolis College of Physicians and Surgeons, 1903; member of the North Dakota State Medical Association; formerly state health officer; at one time member of the state board of education; aged 65; died, August 6, of carcinoma.

Norton Henry Good * Buffalo; University of Buffalo School of Medicine, 1905; on the staffs of the Charity Ear, Eye and Throat Hospital, Deaconess Hospital and the Lafayette General Hospital; aged 63; was drowned, August 24, while fishing at Crescent Beach, Ont.

Pleasant H. Askew Sr., Nashville, Ga.; University of Georgia Medical Department, Augusta, 1897; member of the Medical Association of Georgia; formerly mayor, member of the city council and school board; aged 67; died, August 12, in a hospital at Thomasville.

Raynor Elmore Holmes Sr., * Canon City, Colo.; Northwestern University Medical School, Chicago, 1901; formerly health officer; physician in charge of the Colorado State Penitentiary Hospital; aged 68; died, August 29, in the Corwin Hospital, Pueblo.

Roscoe Daniel Smith * Clarinda, Iowa; Drake University College of Medicine, Des Moines, 1909; member of the American Psychiatric Association; superintendent of the Clarinda State Hospital; aged 59; died suddenly, August 23, of coronary thrombosis.

Tenney Hall Wheatley, Brooklyn; University of Vermont College of Medicine, Burlington, 1896; for many years diagnostician for the New York City Department of Health; on the staff of the Victory Memorial Hospital; aged 72; died, August 4.

Earl Howard Marcum * Bemidji, Minn.; Hahnemann Medical College and Hospital, Chicago, 1903; served during the World War; aged 61; died, August 5, in the Lutheran Hospital of gas bacillus infection following an automobile accident.

Walter Leroy Misener, Richmond, Ind.; Physio-Medical College of Indiana, Indianapolis, 1901; member of the Indiana State Medical Association; veteran of the Spanish-American and World wars; aged 62; died, August 29, of angina pectoris.

Horace M. C. Grow, Yuma, Ariz.; University of Oregon Medical School, Portland, 1926; member of the Arizona State Medical Association; served during the World War; aged 47; died, August 20, in San Diego of acute dilatation of the heart.

William John Tindall, New York; University of Vermont College of Medicine, Burlington, 1897; formerly on the staff of the Neurological Institute; aged 71; died, August 27, in the Veterans Administration Facility of cerebral hemorrhage.

Charles Bernard Yott, Indianapolis; Indiana University School of Medicine, Indianapolis, 1929; member of the Indiana State Medical Association; on the staffs of St. Vincent's and Methodist hospitals; aged 35; was found dead, August 3.

Louis Freedman, Brooklyn; Cornell University Medical College, New York, 1903; member of the Medical Society of the State of New York; aged 65; died, August 28, in Lakewood, Pa., of hypertension and coronary thrombosis.

William A. L. McLister, Brighton, Tenn.; Vanderbilt University School of Medicine, Nashville, 1884; aged 78; died, August 14, in the Baptist Hospital, Memphis, of carcinoma of the prostate with retroperitoneal metastasis.

John B. Mathis, Ullin, Ill.; Barnes Medical College, St. Louis, 1900; member of the Illinois State Medical Society; aged 68; died, August 13, in St. Mary's Hospital, Cairo, of peritonitis secondary to perforated ulcer.

Anton F. Pav * Cleveland; Western Reserve University Medical Department, Cleveland, 1889; formerly on the staff of the City Hospital and St. Alexis Hospital; aged 70; died, August 10, of coronary thrombosis.

Herman Henry Rohwedder, Chicago; Illinois Medical College, Chicago, 1904; also a dentist; aged 67; died, August 26, in the Mercy Hospital, Davenport, Iowa, of arteriosclerosis, hypertension and edema of the lung.

Joseph Stanley Shinn, Troy, Ohio; Starling Medical College, Columbus, 1905; member of the Ohio State Medical Association; served during the World War; aged 61; died, August 20, of coronary thrombosis.

Elizabeth C. Earle, Grand Rapids, Mich.; Woman's Medical College, Chicago, 1884; formerly on the staff of the Butterworth Hospital; aged 83; died, August 29, of chronic myocarditis and cerebral sclerosis.

Peter Ferrini, Middleboro, Mass.; Harvard Medical School, Boston, 1927; member of the Massachusetts Medical Society; assistant superintendent of the Lakeville State Sanatorium; aged 39; died suddenly, August 5.

Francis Nicholis Maginnis, Aurora, Ill.; Chicago College of Medicine and Surgery, 1910; member of the Illinois State Medical Society; aged 68; died, August 10, in St. Charles Hospital of cerebral hemorrhage.

John Egbert Jennison ♂ San Diego, Calif.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1894; aged 72; died, August 19, in the Mercy Hospital of hypostatic pneumonia and bulbar paralysis.

Walter Clarence Simmons, Smiths Grove, Ky.; Vanderbilt University School of Medicine, Nashville, Tenn., 1890; formerly mayor of Smiths Grove; aged 72; died, August 23, of acute dilatation of the heart.

Sarah Gardiner Pierson, Rochester, N. Y.; Syracuse University College of Medicine, 1903; formerly on the staff of the Rochester State Hospital; aged 63; died, August 26, of arteriosclerosis and chronic nephritis.

Douglas L. Gordon, Detroit; Michigan College of Medicine and Surgery, Detroit, 1900; member of the Michigan State Medical Society; aged 63; died, August 28, in the Harper Hospital of coronary occlusion.

Joseph Emerson Welborn ♂ Evansville, Ind.; Indiana University School of Medicine, Indianapolis, 1929; on the staff of the Welborn-Walker Hospital; aged 34; died, August 18, of acute dilatation of the heart.

Orien Lee Patrick Jackson, Union, S. C.; Emory University School of Medicine, Atlanta, 1893; member of the South Carolina Medical Association; aged 68; died, August 3, in the Wallace Thomson Hospital.

Elmer Alfred Pillon, Detroit; Detroit College of Medicine, 1910; on the staff of the Providence Hospital; aged 57; died, August 16, near Leamington, Ont., Canada, of injuries received in an automobile accident.

Allen Greenleaf Crow, Newark, Ohio; Ohio State University College of Medicine, Columbus, 1915; member of the Ohio State Medical Association; served during the World War; aged 49; died, August 5.

William James Reuter ♂ Ohio City, Ohio; Medical Department of the University of Cincinnati, 1913; for many years member of the board of health; aged 51; died, August 1, of cerebral hemorrhage.

Emil Edgar Hein, St. Louis; St. Louis University School of Medicine, 1914; member of the Missouri State Medical Association; aged 49; died, August 31, in St. Albans, Mo., of cerebral hemorrhage.

John Geddes Randall ♂ Missoula, Mont., Hahnemann Medical College and Hospital, Chicago, 1898; for many years president of the school board; aged 67; died, August 15, of coronary occlusion.

Watt Orr McDaniel, Streetman, Texas; Gate City Medical College, Texarkana, Ark., 1905; member of the State Medical Association of Texas; aged 67; died in August of carcinoma of the tongue.

Thad W. Shore, Boonville, N. C.; University College of Medicine, Richmond, Va., 1898; aged 64; died, August 16, in the North Carolina Baptist Hospital, Winston-Salem, of coronary disease.

Ulric Joseph Renaud, Brockton, Mass.; Medical School of Maine, Portland, 1919; member of the Massachusetts Medical Society; aged 43; died, August 12, in the Goddard Hospital of septicemia.

Charles Ralph Spicer, Hastings, Neb.; Rush Medical College, Chicago, 1896; member of the Nebraska State Medical Association; aged 70; died, August 19, of coronary thrombosis.

Thomas Rogers Hoge ♂ Wheeling, W. Va.; Jefferson Medical College of Philadelphia, 1923; aged 45; died, August 3, in the Ohio Valley General Hospital of seminoma of the testicle.

Robert Chester Grieve, Khartoum, Sudan, Africa; University of Oregon Medical School, Portland, 1938; aged 28; was killed, August 23, as the result of a machine gun attack.

John Wood Gordon ♂ Belle Vernon, Pa.; Jefferson Medical College of Philadelphia, 1878; aged 84; died, August 6, in the Allegheny Hospital, Pittsburgh, of myocarditis.

Frank Knight Lord, Richmond, Va.; University College of Medicine, Richmond, 1908; member of the Medical Society of Virginia; aged 60; died, August 18, of nephritis.

Henry G. Horstman ♂ Murphysboro, Ill.; Missouri Medical College, St. Louis, 1895; on the staff of St. Andrew's Hospital; aged 71; died, August 11, of coronary occlusion.

Austin Fisher Clarke ♂ Oakland, Calif.; Kentucky School of Medicine, Louisville, 1892; aged 68; died, August 18, in the Peralta Hospital of nephritis and endocarditis.

James Thomas Walker, Crowder, Miss.; College of Physicians and Surgeons, Baltimore, 1886; formerly mayor; aged 78; died, July 30, at the Lambert (Miss.) Hospital.

William Perry Collins, Colman, S. D.; Bennett College of Eclectic Medicine and Surgery, Chicago, 1901; aged 65; died, August 28, in Brookings of acute appendicitis.

Carl Arthur Smith, Evanston, Ill.; Northwestern University Medical School, Chicago, 1932; aged 40; died, August 2, at the Evanston Hospital of organic heart disease.

Roy Herman McGuire, Medora, Ill.; Washington University School of Medicine, St. Louis, 1932; aged 33; was found dead, August 24, of cerebral hemorrhage.

Herbert Le Roy Ransom, Pittston, Pa.; University of Maryland School of Medicine, Baltimore, 1910; served during the World War; aged 64; died, July 22.

Alfred William Semmens, Sacramento, Calif.; College of Medical Evangelists, Los Angeles, 1915; aged 73; died, August 11, of carcinoma of the prostate.

Guy Howard Swearingen ♂ Sac City, Iowa; Drake University College of Medicine, Des Moines, 1911; aged 59; died, August 8, of cerebral hemorrhage.

Thomas J. Henslee, Newburg, Ky.; University of Louisville Medical Department, 1890; aged 79; died, August 9, of carcinoma of the prostate.

Karl Russell, Allensville, Ky.; Vanderbilt University School of Medicine, Nashville, Tenn., 1897; aged 65; died, August 14, of carcinoma of the face.

Charles H. Meldrim, Savannah, Ga.; University of Georgia Medical Department, Augusta, 1893; aged 72; died, August 14, of coronary occlusion.

William David Haas, Bunkie, La.; Jefferson Medical College of Philadelphia, 1887; aged 73; died, August 26, of coronary thrombosis.

De Willis Little, Appleton, Minn.; College of Physicians and Surgeons, Baltimore, 1883; aged 80; died, August 11, of coronary embolism.

John Collier Robison ♂ Salt Lake City; Tufts College Medical School, Boston, 1904; aged 64; died, August 18, of coronary occlusion.

Joe W. Neal, Walnut Cove, N. C.; College of Physicians and Surgeons, Baltimore, 1889; aged 76; died, August 2, of lobar pneumonia.

Donald Vincent Burns, Brooklyn; Long Island College Hospital, Brooklyn, 1928; aged 39; died, August 25, of cirrhosis of the liver.

Peter Hines Williams, Raleigh, N. C.; Leonard Medical School, Raleigh, 1901; aged 62; died, August 23, of coronary thrombosis.

N. H. Stone, Tazewell, Tenn.; Lincoln Memorial University Medical Department, Knoxville, 1906; aged 76; died, August 4, of uremia.

Joseph William Droogan ♂ New York; Albany (N. Y.) Medical College, 1891; aged 71; died, August 27, of heart disease.

Albert Edward Rogers ♂ Boston; Harvard Medical School, Boston, 1890; aged 72; died, August 8, of coronary thrombosis.

Steven George Harnden, Dalton, Ark. (licensed in Arkansas in 1903); aged 72; died, August 7, of heart disease.

Correction.—In the obituary notice of Dr. William Allen Pusey (THE JOURNAL, September 7, p. 872) it was stated that his grandfather was John T. Hodgen, former President of the American Medical Association. The actual relationship was as follows: "Dr. Pusey's father, Dr. Robert B. Pusey, married Belle Brown, daughter of Alfred M. Brown, who was the son of William Brown who settled in Kentucky in 1790. Alfred M. Brown had a sister who married Jacob Hodgen of Hodgenville, Ky. One of their children was John T. Hodgen, who became a physician and settled in St. Louis and later was made President of the American Medical Association. Actually, Dr. John T. Hodgen was a nephew of the grandfather of Dr. William Allen Pusey."

Correspondence

PREVENTION OF TUBERCULOSIS AMONG RECRUITS

To the Editor:—May I call your attention to what I consider a most important phase of the problem of medical preparedness? I refer to the problem of preventing tuberculosis in the vast army of young men now to be recruited.

As a member of the Committee on Military Affairs of the American College of Chest Physicians, I have given much thought to the tuberculosis problem facing us. One phase of this has already been sufficiently emphasized, namely that of how to prevent repetition of mistakes of the past war. As is well known, an enormous price had to be paid in cost and compensation to persons with old tuberculosis who were erroneously enlisted and became ill before reaching the front or even the training camps.

I am concerned with the far more important and much more difficult problem of preventing the development of fresh tuberculosis in young recruits. Unless we can work out a carefully planned and executed campaign of intensified tuberculosis prevention especially adapted to the present exigencies, we shall be facing the great threat of an epidemic-like occurrence of a newly developed and serious type of pulmonary tuberculosis among the youths of the army.

I am basing this prediction on the conclusions reached in a scholarly treatise recently written by Dr. Israel Rappaport on "Pulmonary Tuberculosis in the Present Epidemiologic Phase," which was presented before the Canadian Tuberculosis Association at its recent summer meeting in Montreal. Permit me to quote his conclusions here, as they will best explain:

We are now witnessing the evolution in our midst of what amounts to a practically new form of chronic pulmonary tuberculosis associated with the current changes in the epidemiology of tuberculosis. The chief characteristics of this new form of pulmonary tuberculosis we would state as follows:

1. Unlike classic phthisis it is of exogenous origin and exposure with its variations in intensity presumably plays a role in its development.
2. It occurs in individuals who at the time of exposure are not sensitive to tuberculin by our modern tests, although they have been infected with tuberculosis previously.
3. Compared with that of classic phthisis its onset is subacute or even acute and its course is far less chronic. It begins with a solitary infiltrative lesion and spreads at least at first chiefly by metastatic infiltrations, in contrast to classic phthisis, which issues from multiple nodular lesions and extends by craniocaudal progression of nodular lesions practically to its terminal phase.
4. It is the prevalent form of chronic pulmonary tuberculosis now in young adults, while classic phthisis is still the prevalent form of tuberculosis in the older age groups.
5. It is a considerably more progressive disease with a definitely higher fatality rate than that of classic phthisis.
6. It owes its evolution to the recent remarkable downward trend in the epidemiologic curve of tuberculosis, its incidence has been rising parallel with the descent of the latter and its features are readily explained from interpretations of the relationship between epidemiology, morbidity and mortality of tuberculosis.

War has always tended to raise the morbidity and mortality from tuberculosis. It seems to me that there is more to fear on this score than there was during the last war because of the recent remarkable shift in the epidemiology of tuberculosis, which left a vast proportion of our young people unprotected against exposure to tuberculosis which was well endured by the youth of a generation ago.

I believe that essentially the same fear is implied in the recent statement of Adamson:

We are on an immunological hotspot from which we dare not retreat for fear of disaster. It is generally agreed that it is safer to have a positive tuberculin reaction if one is to live in an infected atmosphere; since we are bringing up the younger generation with negative tuberculin reaction, we must provide an uninfected environment.

The army of young men which is now to be recruited from all sections of this country will naturally show the great differences in levels of tuberculinization which now exist between them (Frost). Perhaps the majority of these young men must now be expected to have negative tuberculin reactions and hence to be unprepared to meet contact in a new environment which is often likely to be a much overtuberculinized one in comparison to their home environment. Abrupt transition from a detuberculinized to a relatively overtuberculinized environment is the chief breeder of fresh serious pulmonary tuberculosis, particularly among young people. Recent experience with students of nursing and medicine in our hospitals should be interpreted as pointing definitely in this direction. It seems to me that these recent events might well be considered somewhat as a forerunner for that which I believe can be predicted to occur on a vastly multiplied scale among our youthful recruits. Special measures similar to those applied now in our schools of medicine and nursing should be taken in time to prevent the ravages of tuberculosis in our future army.

EDGAR MAYER, M.D., New York.

IMMUNITY TO TETANUS

To the Editor:—In reference to the editorial in *THE JOURNAL*, August 24, page 618, to the effect that "human beings do not acquire a demonstrable immunity against tetanus toxin as a result of environmental exposure," I wish to call attention to the article by TenBroeck and Bauer (Studies on the Relation of Tetanus Bacilli in the Digestive Tract to Tetanus Antitoxin in the Blood, *J. Exper. Med.* 37:479 [April] 1923), published from the Department of Pathology of Peiping Union Medical College, Peiping, China.

These investigators were interested in finding an explanation for the low incidence of tetanus in China, where approximately a third of the population is eliminating tetanus bacilli in the stool (TenBroeck, Carl, and Bauer, *J. H.: ibid.* 36:261 [Sept.] 1922) and where human feces are so generally distributed.

Their conclusions, based on titration studies, were that:

1. The serums of twenty-six persons who carried tetanus bacilli in the digestive tract all contained appreciable amounts of antitoxin.
2. The serums of thirty persons in whose stools no tetanus-like organisms were found were, with two exceptions, free from tetanus antitoxin.
3. Although we have been unable to measure accurately the antitoxin content of these human carriers of tetanus bacilli, 0.1 cc. of serum neutralizes ten or more minimum lethal doses of toxin, and it is evident that they have acquired an active immunity owing to the bacilli in the intestinal tract.
4. These results definitely prove that tetanus bacilli grow in the intestinal tract of man.
5. Many of the persons who have no tetanus bacilli in the intestinal tract and whose serum is free from antitoxin show agglutinins to tetanus bacilli. It is probable that they have been carriers of the bacilli in the past and that the agglutinins have persisted longer than the antitoxins. It seems likely, therefore, that these persons are potentially immune to tetanus.
6. If tetanus bacilli can be established in the digestive tract of man, we have a means of immunization which might be used in armies or in regions in which tetanus infections are common, though we do not recommend this method of immunization at present.

These writers reported the finding of antitoxin (0.1 cc. of serum neutralized at least ten minimum lethal doses of toxin) in fifteen of forty (37.5 per cent) specimens of serum picked at random from their Wassermann laboratory. This observation is of added interest because of the fact that in a previous study they had found that 34 per cent of seventy-eight persons in Peiping had tetanus bacilli in their stools.

The publication cited is of interest for two reasons: 1. It shows that environmental exposure to tetanus bacilli may stimulate the formation of antitoxin in the human body. 2. Support is given to the basic principle of immunization by way of the gastrointestinal tract. However, it is not to be concluded that active immunization by way of the gastrointestinal tract is either desirable or necessary. The feasibility of inducing active immunity by means of tetanus toxoid removes the necessity of resorting to peroral methods.

RALPH SPAETH, M.D., Chicago.

TREATMENT OF DIABETES

To the Editor:—In THE JOURNAL, September 21, page 1038, there appeared a letter concerning some of my remarks on the treatment of diabetes and diabetic emergencies made at a regularly scheduled conference on therapy held at the New York Hospital and Cornell University Medical College. The letter was signed by Drs. Joslin, Root, White and Marble. They disagreed with a number of the statements voiced and were emphatic in their criticism.

My outline in this conference was necessarily brief and was made to a group who understood that all the diabetic patients in our outpatient department were under periodic observation. All had been instructed in diets and many had been shown how to examine the urine for dextrose and acetone. Even though little attention is paid to glycosuria and high blood sugar at present, all the patients with glycosuria were seen every two or three weeks. This was done for two reasons: first, because we were so trained prior to the use of protamine zinc insulin and, second, because we noted no clinical deleterious effects of the glycosuria as reported by the patients who were receiving protamine zinc insulin. I agree with Drs. Joslin, Root, White and Marble that patients with severe (4 plus) ketosis should be sent to the hospital, and I regret that in my brief talk I failed to make that point clear. However, some of the patients who have been followed for months or years and who showed at times only a 1 or 2 plus acetone reaction in the urine were not sent to the hospital but were satisfactorily treated as outlined in my talk.

Dr. Joslin and his group have concentrated their attention on "two rather unusual patients" who were studied in detail in the Metabolism Ward of the Russell Sage Institute of Pathology, which has maintained the same careful technic and high standards in the study of patients since 1914. The results in these two cases were published in the *Archives of Internal Medicine* (64:91 [July] 1939). One of the statements made by Drs. Joslin, Root, White and Marble reads "It does not make common sense to say that an adult of average body build and activity receiving 1,640 calories daily in the form of carbohydrate 200, protein 75, fat 60 Gm. who is excreting 150 or even 100 Gm. of sugar in twenty-four hours, thus leaving a net balance of 1,040 or 1,240 calories respectively, could maintain body weight and be in nitrogenous equilibrium for a prolonged period." I cannot argue the point of whether or not "it makes sense." The facts published in detail in July 1939 clearly show that both patients studied did maintain their weights for from five to six weeks, the experimental period.

Then again Drs. Joslin, Root, White and Marble argue "Does it seem at all likely that the average diabetic patient will be symptomless while continuously excreting 10 per cent, or even 5 per cent, sugar?" Whether it seems likely or not, the patients studied were singularly free from symptoms on days when they did excrete 5 per cent and even 10 per cent of dextrose. I was just as dismayed at this turn of events as were Drs. Joslin, Root, White and Marble. Nevertheless such were my observations, and they were so recorded in all honesty.

The Boston group admits that the proof is lacking that hyperglycemia per se is damaging but insists on perpetuating "beliefs" and "implications" of its effect on infections and atherosclerosis.

Too much attention has been paid to glycosuria and high blood sugar, a carryover of the preinsulin era. With the use of protamine zinc insulin these criteria must be revamped as by the use of this hormone carbohydrate oxidation is assured for about a twenty-four hour period.

To advance, medicine in general and diabetes in particular must be based on firmly established facts obtained by recognized and reliable procedures. The metabolic experiment was done under carefully supervised conditions, the personnel was well trained and the data were most reliable. The results can be questioned only if and when the Boston group, repeating this experiment, obtains contradictory data. Then Drs. Joslin, Root, White and Marble will be in a position to challenge the facts. The Boston group believes in the orthodox treatment of diabetes. I myself am not much worried about the orthodox treatment of diabetes, as records show that orthodox views have changed at least once, and sometimes oftener, in each decade since 1914. From my work I am of the opinion that there may be more than one good method of treating diabetes and its complications ketosis and coma. Based on my experimental data I have extended the technic to the outpatient department, and the report of that work will appear shortly in the *Archives of Internal Medicine*, perhaps this month. I am proud that my views of these therapeutic conferences have extended beyond the walls of the New York Hospital and that they are criticized, because in our own institution my opinions are not shared by all the staff. I encourage this spirit, as I feel that only by frank expression of opinion and criticism, supported by established physiologic principles, can diabetes as well as other controversial medical treatment be placed on a sound basis free from beliefs, implications and traditions. I have great respect for the excellent work of my Boston colleagues. I am surprised, however, when they condemn a method of treatment based on stable experimental data and supported by good clinical results.

EDWARD TOLSTOR, M.D., New York.

"ELECTRICAL CONVULSION TREATMENT OF MENTAL DISORDERS"

To the Editor:—In the editorial in THE JOURNAL August 10 on "Electrical Convulsion Treatment of Mental Disorders" the only reference made concerning the technic is to the English article by Fleming. I should like to point out that the original technic, as utilized by Cerletti and Bini and as used in nearly all the clinics interested in the method, can be found in the English paper by McGregor and Shepley, *British Medical Journal*, Dec. 30, 1939, page 1269. These English workers first explained in detail the original technic. Fleming and his co-workers in their paper describe a technic differing from the original technic in various points, which, however, I do not wish to discuss in detail. In particular, they do not utilize the special electrodes which allow the application of a lower current intensity and a diminished time of passage of current necessary for the production of a seizure.

At the New York State Psychiatric Institute and Hospital, Dr. Kalinowsky and I have adhered to the original technic closely. We have been in constant touch with numerous clinics throughout the world engaged in this type of therapeutic procedure and from personal communications with these clinics we are able to say that several thousands of convulsions have already been produced with this method. It was just in light of the simplicity, the harmlessness and the effectiveness of the original method that we refrained from making any essential changes in the method. We also wish to recommend to American psychiatrists, with this original method, a simple technic which does not necessitate special knowledge of electrology and which may become a practical and useful routine treatment in psychiatric procedures.

S. E. BARRERA, M.D., New York.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

INDUSTRIAL NOISES AND EAR PROTECTION— ALKALI DERMATITIS

To the Editor:—I have recently made a survey of an industrial plant and found two conditions that I should like to correct. 1. About fifteen or twenty men are working in a department where they are exposed to excessive noise, such as steam pressure exhaust. This noise has a tendency to cause changes in the ear drum with acute occupational deafness. 2. There are a like number of men employed removing what they term reject, which is hot impurities from burning limestone. These particles strike them on the arms, hands and face and cause continued irritation with pustules which sometimes become infected. Can you suggest anything these men could use in the ears that would not cause irritation to the canal and any substance they could apply to the arms and face that would prevent the infection?

G. P. Morison, M.D., Charles Town, W. Va.

ANSWER.—1. Prior to the regular use of a device in the ears to protect workers against noises, effort should be made to eliminate the noises themselves if this is practical. In the present instance, for example, the offending steam exhaust pipe might be extended out of close proximity to the workers. In the absence of any such opportunities, some protection may be found in the wearing of "ear defenders," which are directly inserted into the external ear canal for a short distance. One type, marketed by the Mines Safety Appliances Company, provides insulation against approximately 80 per cent of air borne factory noises, in contrast to floor borne noises leading to conduction through the body. These ear defenders when inserted for the first few times may prove temporarily uncomfortable but, fitted properly and after being worn for a few days, are unlikely to prove disturbing. They do not interfere with ordinary conversation.

2. The hot impurities from limestone in addition to causing heat burns may lead to alkali dermatitis. Even though the particles themselves represent impurities and thus conceivably not quicklime; they are prone to be coated with lime dust, which is a well known source of alkali dermatitis. Alkali burns commonly are resistant to ordinary treatment, since usually a tenacious eschar is formed which acts as a foreign body and hampers recovery. By way of prevention of contact, some benefit may be derived from the application of a dense emollient material such as hydrous wool fat, containing mild acids or acid salts. Such a protective ointment, while likely to be of some benefit, usually fails as a complete source of protection. Commercial ointments protecting against alkalis are available. For safeguarding the eyes against alkalis, the wearing of tightly fitting light weight goggles may be necessary. In the type of work described high temperatures prevail, which stands in some relationship to the causation of skin disease, particularly in conjunction with alkali dust. Any temperature reductions may assume a helpful role in combating the dermatitis.

Alkali dust implanted around nail margins may not be removed by ordinary cleansing and may cause damage to nails and may favor secondary mycotic lesions. As a part of whatever protective measures are undertaken, scrupulous personal cleanliness is important.

GROWTH PROMOTING HORMONES

To the Editor:—A girl dwarf aged 8 has a mentality average of better than normal. Is it the type that anterior pituitary preparations would help if anything will. At what age should the preparations be given, what dose, and for how long a time? Is there danger of overstimulation to the sex organs if started too soon?

Copeland Bowers, M.D., Kokomo, Ind.

ANSWER.—The growth or somatotrophic hormone of anterior pituitary extracts is concerned with the general increase in body stature. Since other hormones, such as the gonadotropic and thyrotrophic hormones, of the anterior pituitary also have to do with growth, the term "growth hormone" is somewhat of a misnomer. Because it has a specific chondrotrophic action it has also been spoken of as a chondrotrophic hormone. Experimentally in animals this hormone has been shown to prevent epiphyseal closure. Hence therapy with such a preparation must be started as soon as possible. Clinically it has been shown that, the younger the patient, the more favorable is the result.

Pure preparations of the anterior pituitary growth hormone are not available, although not all of the preparations contain the thyrotrophic and gonadotropic fractions. Oral administration does not give consistent results, and the usual mode of administration is by intramuscular injection. The dosage varies from 0.5 to 1 cc. three times a week to 0.5 to 2 cc. daily. Frequent small doses are believed to be better than larger doses injected at longer intervals. If the dosage is adequate an increase in the rate of growth will appear within two to four months. However, cessation of treatment usually results in a decreased rate of growth, and hence the treatment must be continued until the optimal stature has been reached or the femoral epiphyses have united. If epiphyseal union has occurred before treatment is begun, no improvement in stature need be expected; nonunion can be demonstrated by x-ray examination.

Because the gonadotropic hormone in anterior pituitary extracts is sometimes credited with inducing an early epiphyseal closure, some investigators prefer to use a preparation which is free from this principle. Overstimulation of the sex organs following injections of an extract containing more than the growth hormone is held to be of secondary importance, as cessation of the injections will usually cause a regression of the sexual characters to the stage at which they should be for that age.

In addition to receiving anterior pituitary extracts, the patient should receive vitamin containing preparations such as cod liver or halibut liver oil and yeast preparations. Some clinicians have reported favorable results following the oral use of thyroid even though no evidence of hypothyroidism is present.

The fact that the patient to whom the inquirer refers has a mentality rating of average would tend to suggest an investigation for an existing achondroplasia. This condition may be determined by x-ray examination of the epiphyseal ends of the long bones.

DYSTONIA MUSCULORUM DEFORMANS

To the Editor:—A white woman aged 22 has dystonia musculorum deformans. I have tried in every way to control muscular movements but to no avail. Recently I used quinine with slight improvement. I have been told to try curare on this patient. Can you give me any information as to where I can obtain the drug, how it is administered and how often and for how long it may be given? I would appreciate a bibliography on the use of curare in the treatment of dystonia. M.D., New York.

ANSWER.—Treatment of dystonia musculorum deformans with curare has been carried out by Dr. M. S. Burman of New York. He obtained his preparation from Merck & Co., Inc., but so far as known the preparation has never been on the open market in this country and been used only experimentally, under strict supervision. It is believed that small quantities for experimental purposes may also be available from E. R. Squibb and Sons. The drug is one presenting considerable danger from overdosage. It has also been used experimentally in England by Dr. Ranyard West, although not specifically for dystonia musculorum deformans. Its pharmacologic action on the end plates of the motor nerves has been well known in physiology since the original experiments by Claude Bernard in 1865, and it is now well accepted that the peripheral paralysis caused by curare is due to a blocking of the nervous impulses at the myoneural junction. In doses not sufficient to cause actual paralysis, relaxation of muscular action has been observed by West, Burman and others.

The dosage, according to Burman, varies from patient to patient and depends on the weight of the individual and the extent of the muscular rigidity. Curare may be administered either intramuscularly or intravenously, and the average dystonic patient requires 25 mg. intravenously. Rarely has a larger dose than this been given, although as much as 40 mg. can be used intramuscularly. The effects usually last about two days. After treatment has been well established through a period of a number of weeks, Burman gave 30 mg. intravenously once a week. This appeared to be adequate to maintain the improvement.

The immediate effects of the injection in one patient are described by Burman as follows: The patient noticed a feeling of looseness in the muscles. The spasms tended to return at longer intervals and with less intensity than before injection. Previously unable to walk alone, the patient was able to do so after the injection, although she could not sustain a correct position for any amount of time. She could, however, pick up a glass of water and drink it, a movement that she had not been able to accomplish for several years. Other cases showed like improvement. Burman warns against the indiscriminate use of this powerful drug and suggests that other measures be also considered in the treatment of dystonia musculorum deformans. Mention is made of Putnam's results

of treatment by section of the extrapyramidal tracts of the spinal cord. It should also be noted that Hassin recently has reported on the effect of quinine in this disease, showing that large doses of this drug are decidedly beneficial. An exhibit of charts, photographs and motion pictures showing the collection of curare, the preparation of alcoholic extracts, the pharmacologic action and certain clinical features of the drug was presented as a scientific exhibit by Drs. A. E. Bennett, A. R. McIntyre and A. L. Bennett at the annual session of the American Medical Association in New York in 1940.

References:

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West, Ranyard: Curare in Man, *Proc. Roy. Soc. Med.* **25**: 1107 (May) 1932.
Putnam, T. J.: Results of Treatment of Athetosis by Section of Extrapyramidal Tracts in the Spinal Cord, *Arch. Neurol. & Psychiat.* **39**: 258 (Feb.) 1938.
Hassin, G. B.: Quinine and Dystonia Musculorum Deformans, *THE JOURNAL*, July 1, 1939, p. 12.

PULMONARY EMBOLISM

To the Editor:—I was much impressed by de Takats and Jesser's article on "Pulmonary Embolism" in *The Journal*, April 13. There are two obscure points on which I would appreciate enlightenment. It is said that "two clearcut pulmonary infarcts from a well localizable source would prompt us again to expose the iliac vessels." Would this be for the purpose of ligation of an iliac vein or extraction of the thrombus through the saphenous vein? Again, "ligation of the hypogastric or common iliac veins in septic thrombosis . . . has limitations which have been the subject of previous controversy." In an instance of repeated embolism I was able to ligate the external iliac vein with a satisfactory outcome. (*Am. J. Surg.* **45**: 145 [July] 1939). Will you please indicate the objections to ligation of the external, internal or common iliac veins respectively for thrombosis and embolism? Is not an attempt to extract a thrombus through the saphenous vein likely to cause separation of the thrombus and further embolism?

K. P. A. Taylor, M.D., Panama.

ANSWER.—Dr. de Takats replies: "Following two clearcut pulmonary infarcts I feel that a ligature above the thrombus is definitely indicated. My remark in regard to the ligature of the common iliac in septic thrombophlebitis refers to the old controversy which has raged in the obstetric literature with regard to its value in puerperal sepsis. Our gynecologists and obstetricians have felt that this operation was unable to prevent septicemia but the reports of Bancroft and Neuhof have been so encouraging that I quite recently planned to do one of these.

"I think there is a great deal in what the correspondent says against extracting the clot through an opening in the saphenous. Contrary to usual belief, however, the pressure in the femoral vein is positive and the brisk bleeding would expel the clot. I would do it again only in quite recent clots when the clot is soft and can readily be removed."

SULFANILAMIDE AND AZOSULFAMIDE

To the Editor:—I have been informed that neoprontosil (azosulfamide) has one-tenth the toxicity of sulfanilamide. Is this true? M.D., Texas.

ANSWER.—Some workers have reported that toxic reactions following the use of azosulfamide have been less in number and severity than when sulfanilamide is used but others claim that there is only a slight difference. Complete information on the relative toxicity has not been obtained because of variation among the species of animals used for experimental work and because the results obtained in the lower animals do not necessarily hold true for man. Many investigators believe that reduction of azosulfamide takes place in the tissues to release sulfanilamide as the active agent, while others are not so certain that this fully explains the activity of azosulfamide. The latter group does admit, however, that such a reduction probably plays a major part. The comparative lack of toxicity of azosulfamide may then be more apparent than real because (1) relatively small amounts of free sulfanilamide are released in the body and (2) the drug is rapidly eliminated from the body, from 85 to 95 per cent appearing in the urine within five hours after administration.

Although azosulfamide is considered by some to be as efficacious as sulfanilamide, Long and Bliss (*The Clinical Use of Sulfanilamide and Sulfapyridine and Allied Compounds*, New York, Macmillan Company, 1939) point out that, weight for weight, sulfanilamide should be six times as efficient as azosulfamide if sulfanilamide is the active agent in azosulfamide. Mellon, Gross and Cooper (*Sulfanilamide Therapy of Bacterial Infections*, Springfield, Ill., and Baltimore, Charles C. Thomas, 1938) also report that recent studies prove sulfanilamide to be superior therapeutically to azosulfamide. "Neoprontosil" has not been accepted to date by the Council on Pharmacy and Chemistry.

DEMENTIA PARALYTICA AND COAL MINING

To the Editor:—A man has been referred to me for an opinion as to the hazard involved in his returning to work as a coal miner. He has cerebrospinal syphilis. He was in a state hospital for the insane for fifteen months for dementia paralytica. He was discharged with a statement from the institution stating that he was apparently cured. His general condition now is good and he wishes to return to work. He is 47 years old. The blood pressure is 138 systolic, 84 diastolic. The blood Kahn reaction is positive. The spinal fluid Wassermann reaction is 0.1 four plus, 0.2 four plus, 0.5 four plus. He has no apparent dementia now. The deep reflexes are exaggerated. The pupils react to light and in accommodation. There is no Romberg sign. Please give me an opinion as to the hazard of his returning to work.

M.D., Illinois.

ANSWER.—From the information provided, it is not possible to make a specific recommendation concerning the advisability of this particular patient returning to his hazardous occupation. There are general principles, however, consideration of which make possible accurate decision as to the advisability of return to employment. In the first place, the period of time after apparent recovery from a parietic psychosis is of extreme significance. If the patient in question really had dementia paralytica and recovered after fifteen months of hospitalization, it is fair to assume that he was treated with malaria or some other form of fever. If this assumption is correct, his prospects for a normal future as time passes increase exactly as time passes, i. e. the longer after apparent recovery from a parietic psychosis he maintains a normal status, the greater the chance that that status will be maintained. If the patient has maintained a normal status for five years his prospects for the future are good.

These comments relate to the status of the patient himself, without reference to his occupation. If the occupation involves hazard only to himself, it may be judged accordingly. On the other hand, if his occupation involves the necessity for action or judgment which may jeopardize the safety or lives of other people, the question is different and return to it should be forbidden.

PICROTOXIN AND BARBITURATE POISONING

To the Editor:—What is the largest total amount of picrotoxin used in the treatment of patients with barbiturate poisoning who recovered? I am interested chiefly in reported cases, excluding the communication by Rovenstine in 1938 to the Council on Pharmacy and Chemistry.

M.D., Massachusetts.

ANSWER.—The literature contains close to thirty cases of barbiturate poisoning treated with picrotoxin. Recovery occurred in most of them. References are given in a Report of the Council on Pharmacy and Chemistry (*THE JOURNAL*, Feb. 4, 1939, p. 431). One of the largest doses of picrotoxin reported is that of a person who recovered after taking probably 671 mg. given intramuscularly over a period of four days (Kohn, Richard; Platt, S. S., and Saltman, S. Y.: *The Picrotoxin-Barbiturate Antagonism*, *THE JOURNAL*, July 30, 1938, p. 387). This antidote was not administered until six days after an unknown dose of phenobarbital had been taken. The patient also received apomorphine, oxygen, dextrose solution intravenously, caffeine, nikethamide, strychnine, atropine, strophanthin and ascorbic acid. In another case reported by the same authors 228 mg. was administered intravenously and intramuscularly within twenty-seven hours to a patient who took 100 grains (6.5 Gm.) of barbital and 10 grains (0.65 Gm.) of pentobarbital and recovered. In the first case all the drug was given intramuscularly, in the second mostly by vein.

The largest dose of picrotoxin given in any case of barbiturate poisoning is probably that of E. A. Rovenstine (*Am. J. M. Sc.* **196**: 46 [July] 1938) to which the writer refers. This patient took 500 grains (32.5 Gm.) of barbital and showed signs of recovery with each injection of picrotoxin up to a total of 2,134 mg. but finally had convulsions and succumbed on the eighth day to hypostatic pneumonia and acute hepatitis.

The amount of picrotoxin which may be prudently injected to antagonize a barbiturate depends on the dose of the latter. Large nonfatal doses of the hypnotic are likely to tolerate the largest amounts because of the physiologic antagonism between the two drugs. Small nonfatal doses are likely to respond with rigidity and convulsions even to small doses of picrotoxin. With doses of barbiturate in and above the fatal range, it may be expected that small doses of picrotoxin will prolong the course as much as heroic doses, which may even hasten respiratory failure. Kohn, Platt and Saltman pointed out that picrotoxin convulsions are followed by increased depression and that it is safer simply to increase the picrotoxin injections to the point of spontaneous movements. To reach this stage they recommend repeated intravenous injections; to sustain it, intramuscular administration.

EFFECT OF PNEUMONIA AND SULFAPYRIDINE
ON ASTHMA

To the Editor:—In January 1940 I treated a man aged 65 for type VI pneumonia with sulfapyridine. The same patient has been suffering for twenty-five years with bronchial asthma. The asthmatic attacks have been severe, especially in the hot summer days with paroxysmal dyspnea, which has been intense and suffocative. These attacks are relieved by smoking a mixture of belladonna and stramonium leaves. However, this summer the patient did not have any attacks in spite of the hot weather and appears comfortable nor does he show any signs of dyspnea. I should like to attribute this to a change in allergy as a result of the pneumonia treatment with sulfapyridine. My question now is whether any other medical men have had the same experience. Would you also advise me to treat other persons who have bronchial asthma with sulfapyridine?
M.D., New York.

ANSWER.—There are two possible explanations for the relief from attacks of asthma in this patient. It has been known for many years that fever of any sort frequently brings about a temporary cessation of allergic symptoms, e. g. asthma, hay fever, urticaria and allergic rhinitis. When an asthmatic person develops pneumonia or a severe infection of the upper respiratory tract, malaria or any other febrile condition, the asthma is apt to disappear in whole or in part. A large carbuncle can bring about a similar improvement. But, sooner or later, in from a week to a year or perhaps longer, symptoms almost invariably return. Because of this fact, fever therapy has been tried, with conflicting results, in many allergic individuals. This explanation is probably the correct one. The fact that this patient improved so startlingly after pneumonia would suggest that some form of fever therapy might well be tried later if symptoms should return.

Sulfapyridine has been tried in bronchial asthma but its use is so recent that authentic reports are not available. Asthma is a condition which tends to recur and no reports regarding the efficacy of various procedures are of much value until a year or more has elapsed after the treatment has been started. Asthma in many cases is influenced and perhaps even caused by bacteria. The role of bacteria in allergy is extremely debatable. Perhaps sulfapyridine or a related chemical may help by killing bacteria in the bronchial tubes. To date the results from its use in asthma are not too good, but it would seem well worth while to try out all these drugs in the various allergic conditions. The experiments should of course be well controlled.

INCREASED BLOOD PRESSURE AFTER HEAT
EXHAUSTION

To the Editor:—I have under my care a patrolman aged 46 with a blood pressure reading of 160/90 prior to August 8. On August 8 while on patrol duty he was overcome by the heat of the sun. He complained of dizziness and headache and had signs of general prostration. Since that date his blood pressure has been systolic 180-220 and diastolic 120-150. I would appreciate it if you would give me any information concerning the effects of the sun on blood pressure. Is it possible that the effects of the sun would give an elevation of blood pressure?
M.D., New Jersey.

ANSWER.—The question does not make clear whether the reading of the arterial tension at 160/90 was an isolated single observation or representative of the average level prior to the heat prostration. The difference is significant in interpreting the subsequent changes; a single observation may easily be grossly misleading by either temporary depression or transient elevation of the arterial tension from habitual levels. In the spastic phase of hypertensive disease, wide fluctuations between different observations are the rule. It is therefore possible that the heat prostration has had no real effect on the patient's arterial tension.

The effects of the sun as described are those of excessive heat. Heat exhaustion varies greatly in severity. In the more severe cases with hyperpyrexia the mortality is high, especially among older persons and those with preexisting disorders. Alcoholism greatly increases the injury and risk from exposure to excessive heat. The more common sequels of heat exhaustion include headache, vertigo, impairment of memory, hemiplegia and paraplegias. The most conspicuous pathologic manifestation in the brain is edema, but small hemorrhages are not rare (McKenzie, Pierce, and LeCount, E. R.: Heat Stroke, *THE JOURNAL*, July 27, 1918, p. 260). With preexisting hypertension the probability of cerebral vascular accident is enhanced. The dehydration which is a conspicuous phenomenon of acute heat prostration is a source of renal injury. Renal insufficiency frequently follows when nephritis exists prior to the heat exhaustion and some evidence of renal injury is the rule.

Though exacerbation of hypertension is usually not enumerated as one of the more common consequences of heat prostration, it is clear that there are two possible mechanisms by which such a sequel may arise: cerebral edema and/or hemorrhage and renal

injury with exacerbation of functional impairment. Neurologic and renal functional study of the patient are indicated to determine which of these mechanisms is responsible or whether both are involved.

CORONARY DISEASE AND PAPAVERINE

To the Editor:—What is the status of the use of papaverine in coronary disease? With the dosage of one-third grain (0.02 Gm.) of papaverine hydrochloride twice daily, how long could this therapy be maintained without cumulative effects?
M.D., New York.

ANSWER.—Little use has been made of papaverine in coronary disease. Its chief therapeutic application in circulatory disease has been in the attempt to produce peripheral vasodilatation. In cases of peripheral vascular disease papaverine hydrochloride can be given intravenously in the dose of one-fourth grain (0.016 Gm.) or even up to one-half grain (0.03 Gm.) dissolved in salt solution twice a day. In experimental animals papaverine has been shown to increase the coronary circulation, probably through vasodilatation. The blood pressure falls. Twenty-five years ago it was recommended for hypertension and angina pectoris as well as many other conditions but it has never gained popularity, probably because of its relative inactivity. Levy does not mention it in his chapter on the medical treatment of coronary disease and angina pectoris in the authoritative volume on diseases of the coronary arteries and coronary pain published by the Macmillan Company in 1936. White mentions it as having been suggested and tried in hypertension but does not speak of its use in coronary disease.

ALCOHOLIC INTOXICATION OR TOBACCO
POISONING

To the Editor:—I have been called to testify in the case of a man charged with drunken driving, who denies having had anything alcoholic to drink preceding his arrest for poor control of his car. The officer arresting him says the odor of alcohol was on his breath, but no physician examined him. The defendant claims that he accidentally swallowed a plug of tobacco, which he occasionally chews, after which everything got black and he knew nothing until the awakening in jail. There was no nausea or vomiting. Could swallowing this tobacco cause symptoms similar to alcoholism?
Alvin A. Rosenberg, M.D., Morristown, N. J.

ANSWER.—The swallowing of tobacco may produce facial flushing or pallor, pupillary dilatation or constriction, general muscular weakness and vertigo resulting in unsteady gait or impaired driving, even in habitual users of tobacco. Nausea and vomiting, however, would be expected. The odor of alcohol should not be confused with, though it may be masked by, tobacco and other substances. If the man was not actually stuporous or comatose, later amnesia rather than unconsciousness, accounting for his story, would also suggest alcoholism rather than tobacco poisoning. Detailed analysis of the officer's observations might indicate whether motor incoordination or impaired judgment was present, characteristic of alcoholic intoxication. The use of one of the chemical tests for intoxication, however, would have been particularly valuable in differentiating these conditions.

References:

- Webster, R. W.: *Legal Medicine and Toxicology*, Philadelphia, W. B. Saunders Company, 1930.
Report of the Committee to Study Problems of Motor Vehicle Accidents, *THE JOURNAL*, May 27, 1939, p. 2165.
Acute Alcoholism and Shock, *Queries and Minor Notes*, *ibid.*, Jan. 11, 1939, p. 125.
Examination for Alcoholic Intoxication, *ibid.*, Sept. 12, 1931, p. 798.

OBESITY AND MANGANESE DIOXIDE

To the Editor:—Would you please give me a little information on the safety and efficacy of manganese dioxide as an aid in the treatment of obesity? Is there any danger of manganese poisoning? I have been using just a little in 5 grain (0.3 Gm.) doses three times daily.
M.D., Illinois.

ANSWER.—No evidence for the rationale or recognized application of manganese dioxide in the treatment of obesity has been found. No reference to it has been obtained in the medical literature.

There appears to be little danger of manganese poisoning when the material is taken by mouth, chiefly because its absorption from the gastrointestinal tract is slight. Manganese poisoning does occur rather rarely as an occupational disease, in individuals exposed to the dusts of manganese compounds. In these cases the absorption is partly by inhalation. The symptoms of poisoning are primarily those of central nervous system involvement.

A review of the subject by W. F. von Oettingen of the Department of Pharmacology, Western Reserve University School of Medicine, will be found in *Physiological Reviews* 15:175 (April) 1935.

Medical Examinations and Licensure

COMING EXAMINATIONS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in *THE JOURNAL*, October 5, page 1219.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 17-19. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ARKANSAS: * Regular. Little Rock, Nov. 7-8. Sec., Dr. D. L. Owens, Harrison, *Eclectic*. Little Rock, Nov. 7. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), Los Angeles, Dec. 11. *Written examination*. Sacramento, Oct. 21-24. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

CONNECTICUT: * *Written*. Hartford, Nov. 12-13. *Endorsement*. Hartford, Nov. 26. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. *Homeopathic*. Derby, Nov. 12-13. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: July 8-10. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: * Washington, Nov. 11-12. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: * Tampa, Nov. 18-19. Sec., Dr. W. M. Rowlett, Box 786, Tampa.

HAWAII: Honolulu, Jan. 8-11. Sec., Dr. James A. Morgan, 48 Young Building, Honolulu.

INDIANA: Indianapolis, June 17-19. Sec., Board of Medical Registration and Examination, Dr. J. W. Bowers, Citizens Trust Bldg., Fort Wayne.

IOWA: Des Moines, Dec. 9-11. Dir., Division of Licensure and Registration, Mr. H. W. Greffe, Capitol Bldg., Des Moines.

KANSAS: Topeka, Dec. 10-11. Sec., Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, Dec. 3-5. Sec., State Board of Health, Dr. A. T. McCormack, 620 Third St., Louisville.

MAINE: Portland, Nov. 12-13. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Regular*. Baltimore, Dec. 10-13. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic*. Baltimore, Dec. 10-11. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 12-14. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MINNESOTA: * Minneapolis, Oct. 15-17. Sec., Dr. Julian F. Du Bois, 350 St. Peter St., St. Paul.

MISSISSIPPI: *Reciprocity*. Jackson, December. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MISSOURI: Kansas City, Oct. 29-31. Sec., State Board of Health, Dr. Harry F. Parker, State Capitol Bldg., Jefferson City.

NEVADA: *Reciprocity* with oral examination, Nov. 4. Sec., Dr. Fred M. Anderson, 215 N. Carson St., Carson City.

NEW HAMPSHIRE: Concord, March 13-14. Sec., Board of Registration in Medicine, Dr. T. P. Burroughs, State House, Concord.

NEW JERSEY: Trenton, Oct. 15-16. Sec., Dr. Earl S. Hallinger, 28 W. State St., Trenton.

NORTH CAROLINA: *Reciprocity*. Durham, Dec. 3. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, Jan. 7-10. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OKLAHOMA: * Oklahoma City, Dec. 11. Sec., Dr. James D. Osborn Jr., Frederick.

OREGON: * *Reciprocity*. Portland, October. *Written*. Portland, Jan. 14-16. Exec. Sec., Miss Lorraine M. Conlee, 608 Failing Bldg., Portland.

PENNSYLVANIA: Philadelphia, January. Acting Sec., Bureau of Professional Licensing, Miss Marguerite G. Steiner, 358 Education Bldg., Harrisburg.

SOUTH CAROLINA: Columbia, Nov. 12. Sec., Dr. A. Earle Boozer, 505 Saluda Ave., Columbia.

SOUTH DAKOTA: * Pierre, Jan. 21-22. Dir., Medical Licensure, Dr. J. F. D. Cook, Pierre.

TEXAS: Austin, Nov. 25-27. Sec., Dr. T. J. Crowe, 918-920 Mercantile Bldg., Dallas.

VERMONT: Burlington, Feb. 11. Sec., Dr. W. Scott Nay, Underhill.

VIRGINIA: Richmond, Dec. 4-6. Sec., Dr. J. W. Preston, 30½ Franklin Rd., Roanoke.

WEST VIRGINIA: Morgantown, Oct. 31-Nov. 2. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WISCONSIN: * Madison, Jan. 14-17. Sec., Dr. H. W. Shutter, 425 E. Wisconsin Ave., Milwaukee.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARKANSAS: Little Rock, Oct. 21. Sec., Mr. Louis E. Gebauer, 701 Main St., Little Rock.

CONNECTICUT: New Haven, Oct. 12. Address State Board of Healing Arts, 1945 Yale Station, New Haven.

DISTRICT OF COLUMBIA: Washington, Oct. 21-22. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: Gainesville, Nov. 1. *Applications must be on file not later than Oct. 16*. Sec., Prof. J. F. Conn, John B. Stetson University, DeLand.

OKLAHOMA: Oklahoma City, Nov. 18. Sec. of State, Hon. C. C. Childress, State Capitol, Oklahoma City.

OREGON: Portland, Oct. 26. Sec., Mr. Charles D. Bryne, State Board of Higher Education, University of Oregon, Eugene.

RHODE ISLAND: Providence, Nov. 20. Acting Chief, Division of Examiners, Mr. E. Clyde Thomas, 366 State Office Bldg., Providence.

SOUTH DAKOTA: *Examination*. Yankton, Dec. 6-7. *Endorsement*. Dec. 21. Sec., Dr. Gregg M. Evans, Yankton.

Alabama June Report

Dr. J. N. Baker, secretary, Alabama State Board of Medical Examiners, reports the written examination for medical licensure held at Montgomery, June 18-20, 1940. The examination covered ten subjects and included 100 questions. An average of 75 per cent was required to pass. Twenty-six candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Howard University College of Medicine.....	(1937)*		79.9
Emory University School of Medicine.....	(1940)*	83.1,	90.5
Northwestern University Medical School.....	(1940)*		84.8
Rush Medical College.....	(1940)*	87,	88.3
Louisiana State University School of Medicine.....	(1940)*		82.2
Tulane University of Louisiana School of Medicine....	(1939)*		83.4,
(1940)*	86.9, 88.7, 88.8,	91.5, 91.8,	93.1
Harvard Medical School.....	(1936)*		82.2, (1940)*
Long Island College of Medicine.....	(1938)*		88.2
New York University College of Medicine.....	(1940)*		85.2
University of Pennsylvania School of Medicine.....	(1940)*		89.7, 92.3
Medical College of the State of South Carolina.....	(1940)*		84.6,
89, 89.4			
Vanderbilt University School of Medicine.....	(1940)*		87.5, 88.2

* Licenses have not been issued.

Delaware July Report

Dr. Joseph S. McDaniel, secretary, Delaware State Board of Medical Examiners, reports the written examination for medical licensure held at Dover, July 9-11, 1940. The examination covered ten subjects and included 100 questions. An average of 75 per cent in each subject was required to pass. Fifteen candidates were examined, all of whom passed. One physician was licensed to practice medicine by reciprocity. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
College of Medical Evangelists.....	(1940)		83.1
Hahnemann Medical College and Hospital of Phila.....	(1937)		85.4,
(1939)	82.7, 83.2		
Jefferson Medical College of Philadelphia.....	(1938)		82.6,
(1939)	84.2, 84.4, 87.8		
Temple University School of Medicine.....	(1934)	85, (1938)	79.5,
85.2, (1939)	80		
University of Pennsylvania School of Medicine.....	(1938)		79.5
Woman's Medical College of Pennsylvania.....	(1935)		81
University of Tennessee College of Medicine.....	(1938)		78.1

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Pennsylvania Department of Medicine....	(1908)		Penna.

Minnesota June Report

Dr. Julian F. Du Bois, secretary, Minnesota State Board of Medical Examiners, reports the written examination for medical licensure held at Minneapolis, June 18-20, 1940. The examination covered twelve subjects and included sixty questions. An average of 75 per cent was required to pass. Forty-nine candidates were examined, all of whom passed. Four physicians were licensed by reciprocity to practice medicine and two physicians so licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of Southern California School of Medicine....	(1937)		90
Yale University School of Medicine.....	(1937)		90.6
Loyola University School of Medicine.....	(1940)	85.1, 88.1,	91.3
Northwestern University Medical School.....	(1939)	87.1, (1940)	84.6, 91.4
Rush Medical College.....	(1938)		91, 92.1
University of Illinois College of Medicine.....	(1940)		89.3
Harvard Medical School.....	(1936)	86.6, (1937)	89.1
University of Minnesota Medical School.....	(1937)		91.1,
(1938)	89.1, (1939)	84.5,* 86.6, (1940)	82.1,* 83,
83.2,* 84.2,* 84.3,* 84.5,* 85,* 85.4,* 85.6,* 86,			
86.4,* 86.5,* 87,* 87,* 87.1, 87.3,* 87.6, 88,*			
88.5,* 89.1,* 89.1,* 89.3, 90.5,* 92			
Washington University School of Medicine.....	(1937)		91.4
University of Pennsylvania School of Medicine.....	(1937)		91
Marquette University School of Medicine.....	(1940)	88.3, 88.6, 89.1,	89.4

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Washington University School of Medicine.....	(1937)		Missouri
Creighton University School of Medicine.....	(1939)		Nebraska
University of Nebraska College of Medicine.....	(1938)		Nebraska
University of Wisconsin Medical School.....	(1928)		Wisconsin

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
University of Minnesota Medical School....	(1938), (1940)		N. B. M. Ex.

* This applicant has received the M.B. degree and will receive the M.D. degree on completion of internship.

Book Notices

Juvenile Delinquents Grown Up. By Sheldon and Eleanor Glueck. Cloth. Price, \$2.50. Pp. 330. New York: Commonwealth Fund; London: Oxford University Press, 1940.

In 1934 the authors of this book published a report covering the careers of 1,000 delinquent boys over a period of five years after they had been brought before a juvenile court. The present work continues the study of as many of the original group as could be found over an additional ten year period. The careers of delinquency or of recovery are described in five year periods, the original work of 1934 constituting the first of these periods. The fifteen years that has elapsed since these boys were before the Boston Juvenile Court, at an average age of 13½ years, have seen them enter adulthood.

The authors note a steady increase in the proportion of delinquents who abandon criminal behavior, and among those who remain delinquent the delinquencies tend to become notably less serious in character. However, a relatively large number of the offenders continue to be delinquent, 226 remaining serious and eighty-eight minor offenders throughout the entire fifteen years of record.

The authors study the factors that correlate with successful and unsuccessful outcomes and make comparisons between reformed and unreformed offenders, serious and minor offenders, and the successes and failures during intramural and extramural treatment. On the basis of differences observed in the comparisons of backgrounds and characteristics of the various groups of offenders, the possibility of predicting with reasonable accuracy the future behavior of the delinquents was explored and prediction tables were constructed based on a few selected factors.

The authors, having demonstrated that with passage of time there is a continuing decrease in the number of youths who continue to be offenders, propose the theory that "the physical and mental changes that comprise the natural process of maturation offer the chief explanation of this improvement in conduct with the passing of the years." Their study reasserts the importance of heredity, "innate equipment" and early environment in favorably influencing the course of delinquency and, presumably, the process of maturation. They are able to distinguish four "conduct types." Type 1 constitutes those who succeeded during some intramural and extramural treatments and are to be distinguished from those of type 2, who failed during both these types of treatment. Members of type 2 are shown to have been subjected to much less favorable circumstances in early life. Inadequate sense of security in early upbringing was reflected in members of type 3, who did well in intramural treatment but poorly in extramural treatment. Members of type 4, who had demonstrated their inability to get along in other group situations in life, failed in institutional treatment but did well in extramural forms of treatment. The authors offer tables predicting behavior during the various forms of penocorrectional treatment on the basis of these differences in treated offenders. It is noted in both intramural and extramural treatment that the behavior of the offenders tended to improve in time, more markedly so during intramural treatment.

The Gluecks recognize two types of "reformed" individuals, those who have achieved a maturity in physical, mental and emotional development that enables them to abandon criminality, and those who abandon criminality as a result of deterioration of their powers. The former are integrated personalities, the latter succumb to the disintegration or deterioration of their faculties.

The authors suggest that their observations, and particularly their prediction tables, could now make possible practical experimentation by courts and parole boards. Disposition of every second case by aid of the prediction tables is proposed, with an eventful follow-up of the two groups thus dealt with. The prediction tables "furnish to courts and parole boards a rational implementation of the indeterminate sentence." The prediction tables also indicate the group of criminals of whom reform or improvement is not to be anticipated.

The Gluecks have done their usual type of thorough job in covering an amazing mass of material, the accumulation of

which in itself called for much resourcefulness. Their observations, their tables and their account of what actually happens to delinquents warrant the closest consideration of all students of criminal behavior. Their studies, as they explicitly state, indicate that there still is much to be learned about delinquency and about the treatment of delinquency. Their emphasis of the role of maturation in delinquency is in agreement, as they indicate, with psychoanalytic formulations of these disturbances in conduct (p. 268). "The next step in developing the theory of the relationship of maturation to delinquency and criminality is to dissect 'maturation' into its components. Such a task must be left to specialists in psychiatry, psychology, physiology, medicine and related disciplines" (p. 270). This suggestion, in effect, brings us back to the precise emphasis in the study to delinquency made by William Healy, Herman Adler and others. It is clear that for prevention of delinquency the specific factors favorably or unfavorably influencing personality growth and development must be understood for the individual delinquent. Alexander and Healy's "Roots of Crime" comes to mind. The Gluecks' suggestions relative to use of their prediction tables may have merit in reducing the guesswork in disposition of delinquents, but there is the problem that prediction tables worked out for the Boston population of delinquents might be of meager usefulness, say, in New Orleans. They properly insist that a better understanding of what actually happens to a delinquent psychologically under various forms of treatment is required. They indicate that further studies contributing to these incompletely understood problems may be undertaken by them. These will be awaited with interest by students of delinquency and criminality.

American Doctors of Destiny: A Collection of Historical Narratives of the Lives of Great American Physicians and Surgeons Whose Service to the Nation and to the World Has Transcended the Scope of Their Profession. By Frank J. Jirka. With an Introduction by Harold W. Camp. Cloth. Price, \$3.75. Pp. 361, with 20 portraits by Raymond Warren. Chicago: Normand House, 1940.

This is a collection of biographic sketches of twenty doctors who, the author believes, are destined for the American Hall of Fame. One should not be too critical of his choice of candidates for this honor, for no two physicians would agree as to who should be selected or even on what basis the selection should be made. But really the group is a motley one. One finds many of the old stand-bys: Benjamin Rush, Ephraim McDowell, Daniel Drake, W. T. G. Morton, Walter Reed and General Gorgas. There are several new ones who are less widely known. The claim for the inclusion of some of these is that they selected, or had thrust upon them, some job—at times a political one—and did the job well. This is, of course, praiseworthy. But, without mentioning names, not all of these are of national caliber. And, as the reviewer looks at it, it shows poor judgment prematurely to include names of men still living and whose life work is far from finished. This is particularly true in the case of those who are apparently so intimately related in a social or medical way to the author as unconsciously perhaps, yet inevitably, to bias his judgment. One questions also the good taste shown by Dr. Jirka in permitting in the introduction extremely laudatory references to himself, with extravagant claims for his accomplishments during his short term of four years in office as director of the Illinois State Department of Public Health. Dr. Harold Camp, who writes this introduction, virtually nominates Dr. Jirka as an American Doctor of Destiny. And Dr. Jirka in a final chapter shows no resentment. The book is a medley of good, bad and mediocre. Some of the best chapters—and there are interesting ones that are well worth reading by the layman—are frankly compiled from biographies written by other hands. There are also many sentiments regarding doctors, their relations to patients and their mission as public servants that are well expressed by Dr. Jirka when writing in his own person and that must be heartily applauded. But there is a too free use of superlatives and too often one finds what sounds more like the ballyhoo of a political speaker than the sober words of an impartial, judicially minded historian or biographer. The drawings by Warren are well done. Several typographic errors have escaped the proofreader. One of these would have made Dr. Oliver Wendell Holmes smile, for it is a reference to his novel as "A Moral Antipathy."

Surgery of the Hand: Some Practical Aspects. By John Harold Couch, M.A., M.B., F.R.C.S., Department of Surgery, University of Toronto and Toronto General Hospital, Toronto. Foreword by W. E. Gallie, M.D., F.R.C.S., Dean of the Faculty of Medicine, University of Toronto. Cloth. Price, \$1.50. Pp. 147, with illustrations. Toronto: University of Toronto Press; London: Oxford University Press, 1939.

The author has compressed a great deal of helpful advice and information into this well illustrated little volume. The repair of injuries of the hand, with particular reference to nerve and tendon injuries, the correct levels for amputation of individual digits, and in part II the important principles involved in the treatment of infections of the hand have been simply and clearly discussed. One point in which we believe the author's advice cannot be taken without question should be mentioned. He says (p. 52) "Movement can be instituted almost immediately after (tendon) suture has been completed, for the strength of the suture will suffice until the tendon is strongly united." The experimental work of Mason and Allen shows that at the end of from eight to fifteen days the newly forming tendon callus is soft and gelatinous; at this stage suture material can be pulled through the callus with but little tension, and movement can result in partial or complete separation at the line of suture. In other words, no form of suture material is proof against separation if mobilization is begun before the tendon callus is firm enough to prevent cutting through of the suture. This volume should prove an invaluable aid to the student and the general practitioner and should help to stimulate the ever increasing interest in this important branch of surgery.

Dynamics of Inflammation: An Inquiry Into the Mechanism of Infectious Processes. By Valy Menkin, Department of Pathology, Harvard University Medical School, Boston. Cloth. Price, \$4.50. Pp. 244, with 50 illustrations. New York: Macmillan Company, 1940.

This volume represents the recent publications of the series of Experimental Biology Monographs designed to give in monographic form the most recent researches in the biologic sciences. The author attempts to describe inflammation from the physiologic, immunologic and biochemical as well as the morphologic point of view, drawing considerably on his own investigations. Inflammation in relation to infectious processes is especially emphasized. Allergic and anaphylactic reactions are discussed with reference to their role in the fixation of antigens. Leukotoxin, a crystalline nitrogenous substance, is offered as the agent responsible for capillary permeability and the migration of leukocytes to points of injury. The context and bibliography should be of value to pathologists and bacteriologists interested in the immunologic and chemical phases of inflammation.

Clinical Heart Disease. By Samuel A. Levine, M.D., F.A.C.P., Assistant Professor of Medicine, Harvard Medical School, Boston. Second edition. Cloth. Price, \$6. Pp. 495, with 109 illustrations. Philadelphia & London: W. B. Saunders Company, 1940.

This is a timely book for the medical student as well as the general practitioner interested in heart disease. The subject matter is presented in simple clear fashion. Throughout, stress is laid and quite properly so on the clinical aspects of heart disease and one is impressed with the author's regard for the patient as an individual as well as the medical problems involved. The personal bedside experiences are interesting and help to emphasize the value of clinical observation and experience.

The new chapter on the medicolegal aspects of heart disease is of current interest and importance and opens up a field which will probably require more consideration in the future on the part of the medical profession. It is highly questionable, however, whether "shadowing" a patient in a medicolegal case is the physician's duty.

Thyroid heart disease with emphasis on "masked thyrocardiacs" is again stressed to help clinicians recognize that group of cases in which such brilliant results are often obtained when the underlying cause of the cardiac disability is recognized and corrected. The author's experience in the treatment of subacute bacterial endocarditis coincides with that of most clinicians. It is suggested that the use of sulfanilamide and heparin in these cases is worth trying. The chapter on acute cardiovascular emergencies should be of value to all practitioners who may be called on at almost any time to administer in such cases. The treatment of congestive heart failure has been enlarged on and

more space is devoted to the subject, which after all is probably the most important part of clinical heart disease for the patient as well as for the doctor. The author's approach to the whole subject is that of the proved and experienced clinician and affords many valuable and practical suggestions for the clinical recognition, evaluation and treatment of the patient with heart failure. A sizable portion of the book is devoted to clinical electrocardiography. The value of the electrocardiogram as well as its limitations is stressed and it is gratifying to have Dr. Levine emphasize the latter and present it in its real place in cardiology. It would seem that too much emphasis and unwarranted importance have been placed on the electrocardiogram by many a present day physician to the exclusion of the more important clinical aspects of heart disease, and this book's views will undoubtedly aid in clarifying the matter. The electrocardiographic illustrations and the text of this particular chapter afford an excellent opportunity to any one interested in learning clinical electrocardiography.

This volume covers the important aspects of heart disease as encountered in practice and has a real place on the list of worthwhile textbooks for the medical student, intern and clinician.

Précis d'oto-rhino-laryngologie. Par Georges Laurens, Maurice Aubry, laryngologiste des hôpitaux de Paris, et André Lemarié, laryngologiste des hôpitaux de Paris. Second edition. Cloth. Price, \$3.90. Pp. 1,241, with 460 illustrations. Paris: Masson & Cie, 1940.

This edition of Laurens's compendium follows the plan that characterizes the entire series of textbooks put out by Masson and Company in presenting a textbook that is not too involved for the student and general practitioner and yet is ample as a reference book for the young laryngologist. The new items added since the first edition comprise chapters on audiometry, petrositis, cancer of the hypopharynx, pharyngeal manifestations of hematologic conditions, dyspnea in infants and radiography in cancer of the larynx, which bring the text down to date. The author and his associates have carefully adhered to known and accepted facts and principles, avoiding items that are more or less controversial. An index of their restraint for example is manifest in their conservative discussion of retrobulbar neuritis in relation to posterior sinus disease, a topic on which many of the French authors are particularly radical. The book covers the vast territory in necessarily concise style and almost everything in the domain of otolaryngology receives some mention. While the illustrations are not particularly artistic, they serve the purpose. It is interesting to note that at the time the book was issued its cost in American money was only \$3.90, which is remarkably cheap for a textbook of its size and character. For those who have a reading knowledge of the French language it is both interesting and stimulating to peruse this book and to note that though it differs from our own textbooks in some minor details it compares favorably with some of our best.

Artificial Limbs and Their Relation to Amputations. Ministry of Pensions. Cloth. Price, 90 cents; 3s 4d. Pp. 88, with 42 illustrations. New York: British Library of Information; London: His Majesty's Stationery Office, 1939.

The large number of casualties in the war of 1914-1918 provided an important proving ground for the development of artificial limbs. This experience was utilized by the British Ministry of Pensions to develop acceptable standards of appliances to meet the needs of amputees. The result of this work has been crystallized into the present small volume, which briefly yet completely describes ideal sites and methods of amputation, types of artificial limbs and appliances, and methods of fitting. The publication is particularly timely because of the present war and provides a basis for the management of similar problems that are sure to arise among the new amputees. The reviewer's experience has been confined for the most part to the problems of civilian amputees, but their problems and those of the war disabled are not dissimilar. However, the use of temporary prostheses such as plaster pylons has not been considered necessary in this country, since thigh lacers and other methods of preliminary shrinking have been generally considered adequate. While the book should be of value to military, industrial and orthopedic surgeons, it is of especial importance to administrative agencies which may be concerned with the problems of organization in the field of rehabilitation of the amputation cases.

Manuel de classification et de détermination des bactéries anaérobies. Par André R. Prévot, chef de service—adjoint à l'Institut Pasteur. Paper. Price, \$1.15. Pp. 223, with one illustration. Paris: Masson & Cie, 1940.

The author states in the preface that he has had seventeen years of experience in working with anaerobes. He has been interested in the classification of anaerobes and is a member of the International Committee on the Classification of Bacteria. The purpose of this manual is to afford a working classification of the anaerobes. The author was urged by his friends in the army to get out rapidly a book which would be helpful to the laboratory staff in classifying anaerobes from various wound infections. This book was put out in response to that demand. The author believes that the three most important features in classifying anaerobes are spore formation, Gram stain and motility. He, of course, takes into account morphology, general physiology, cultural and biochemical reactions, pathogenicity and serologic and immunologic reactions. The book is comprehensive and catalogues the nonsporulating as well as the sporulating anaerobes, cocci, actinomycetes and spirochetes. Many new families and genera have been added. For instance, *Bacillus tetani* or *Clostridium tetani* is listed in the order of Plectridiales, the family Plectridiaceae and the genus Plectridium and is called Plectridium tetani. *Bacillus welchii* or *Clostridium welchii* is in the family Clostridiaceae and in the genus Welchia and is called Welchia perfringens. The creation of new names for the anaerobes is going to add to the long list of names which some of them now have. The anaerobes have been much neglected by medical bacteriologists and this book should prove stimulating to physicians as well as to laboratory workers.

For Daughters and Mothers. By Valeria Hopkins Parker, M.D., Director, Bureau of Marriage Council and Education for Social and Family Relations. Cloth. Price, \$1.50. Pp. 138. Indianapolis & New York: Bobbs-Merrill Company, 1940.

This is a book on relationships between mothers and daughters as daughters enter adolescence. It deals largely with sex development in adolescence but also gives considerable attention to other problems, particularly the growth of independence and impatience at restraint which characterize the adolescent. The book contains much excellent advice, both for mothers and for daughters, about how to live harmoniously in spite of frequently clashing points of view due to difference in age and outlook. The chapter headings are descriptive of the content of the book, dealing as they do with childhood, new horizons and new outlooks, the chain of life, new bodies, "having a good time," looking toward romance, "how do you know when you're in love?", working plans, women of tomorrow, and the great adventure. Toward the end of the book the chapters begin to be a trifle sketchy and to give the impression of having been prepared less thoroughly than the earlier chapters. In general, however, the book can be recommended to physicians who seek books of this type to recommend to their patients.

Lectures on Motor Anomalies. By Alfred Bielschowsky, M.D. Foreword by Walter B. Lancaster, M.D. Paper. Price, \$1. Pp. 128, with 62 illustrations. Hanover, New Hampshire: Dartmouth College Publications, 1940.

The twelve lectures of this monograph were delivered before the Research Study Club of Los Angeles in January 1938. They were first published in the *American Journal of Ophthalmology* in a series beginning in August 1938 and ending in August 1939. Coming from the University of Breslau in Silesia in 1934, the author gave more than a hundred lectures and demonstrations on ocular motility. Remaining in the United States as head of the Eye Clinic of Dartmouth College, Dr. Bielschowsky died suddenly in New York January 5 and was deprived of the opportunity to realize his cherished plan of writing a comprehensive textbook in English on the special field in which he attained world renown. In the foreword by Dr. Lancaster the final statement that "the lectures which are collected in this volume are a small but vivid token of his knowledge, experience and didactic ability" is indeed true. Those of us who enjoyed the privilege of hearing Dr. Bielschowsky lecture were intrigued by his simple, understandable delivery, which is reflected in this work. Controversial subjects are approached from all angles, due credit is given to various authorities with dignified humility, and the whys and wherefores of the author's own views are simply told. The author's vast experience in this limited field

and his knowledge of the fundamental physiology and pathology of the ocular muscles, together with his neurologic acumen reflected in these lectures, makes for the inclusion of this volume in the library of every ophthalmologist.

The Varieties of Human Physique: An Introduction to Constitutional Psychology. By W. H. Sheldon, Ph.D., M.D. With the collaboration of S. S. Stevens, Ph.D., and W. B. Tucker. Cloth. Price, \$4.50. Pp. 347, with 104 illustrations. New York & London: Harper & Brothers, 1940.

The authors point out the need for a description of human physiques which can readily be obtained and which can be of use in studies of personality and clinical problems. They outline a method for "somatotyping" an individual. It consists of photographing an individual from the front, side and back and then evaluating the figures on the negative or print. The evaluation is in part anthroposcopic and in part anthropometric. A number consisting of three digits is finally obtained. Each digit may range from 1 to 7. For example, 154 and 714 are typical evaluations. The authors claim a high degree of reliability for their evaluations. The book is easily read but unnecessarily long. Its usefulness would have been increased had it been concise. What value "somatotyping" may serve is problematic. There is without doubt a need for physical measurements on a large scale which can be used for correlation with other physical and mental characteristics, but it is questionable whether somatotyping will serve that need. Perhaps it will for a time.

St. Thomas's Hospital Reports. Edited by Prof. O. L. V. S. de Wesselow and Mr. C. Max Page. Assisted by Mr. N. R. Barrett, Dr. J. St. C. Elkington and Dr. A. J. Wrigley. Second Series. Vol. IV. Cloth. Price, 10s. Pp. 198, with illustrations. London, 1939.

Here are collected a group of papers by members of the St. Thomas staff. Some papers, such as these on oxygen therapy, cerebral abscess, empyema and orbital inflammation, are instructional and deal with technics and clinical observations and indications. A review of the male sex hormone is followed by a case report of macrogenitosomia in one of twin boys. The surgical treatment of gastroduodenal hemorrhage is discussed. The anatomic changes associated with closure of the ductus arteriosus are outlined in pathologic changes in the wall of the ductus arteriosus. Other titles include acetylcholine and potassium in relation to cardiac function, thorium-x irradiation in cutaneous therapy and estimation of the water soluble vitamins in the body fluid. The typography is excellent.

An Index of Treatment. By Various Writers. Edited by Sir Robert Hutchison, Bt., M.D., LL.D., Consulting Physician, London Hospital, London. Assisted by Reginald Hilton, M.A., M.D., F.R.C.P., Physician to St. Thomas's Hospital, London. Twelfth edition. Cloth. Price, \$12. Pp. 996, with 148 illustrations. Baltimore: William Wood & Company, 1940.

In the present edition of this companion volume to the equally well known index of differential diagnosis, of which French is editor, no alterations in plan or format have been made. The number of individual contributors has been reduced from ninety-one to seventy-eight. A few subjects make their appearance for the first time, the principal ones being bone setting, rat bite fever, sebaceous cysts and syndactyly. Few of the treatises seem to have been completely rewritten—an unfortunate fact in certain instances, notably pneumonia. The book must continue to disappoint those who wish to have an unprejudiced and inclusive therapy presented in a specific fashion.

Die geburtshilflichen Operationen: Ihre Ausführung und Anwendung. Ein Lehrbuch für Studierende und Gebrauchsbuch für Ärzte. Von Prof. Dr. med. Heinrich Marthus, Direktor der Universitäts-Frauenklinik Göttingen. Second edition. Paper. Price, 12 marks. Pp. 286, with 281 illustrations. Leipzig: Georg Thieme, 1940.

This book is devoted almost entirely to obstetric operations including perineal lacerations, forceps operations, breech extraction, version and extraction, manual removal of the placenta and cesarean section. At the beginning are large sections on the obstetric pelvis and the mechanism of labor. The illustrations, nearly all of which have been beautifully drawn, are the chief asset of the book. This is as it should be, because any book dealing with operative procedures should have numerous instructive illustrations. There is nothing new in the book, because its entire contents may be found in any of the standard textbooks of obstetrics. Hence the need of such a book is questionable.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Harrison Narcotic Act: "Prescribing" Narcotics for Addicts.—Defendant Heller, a physician, was prosecuted for violation of the Harrison Narcotic Act on a charge that he had entered into a conspiracy with defendant Kuhn, a pharmacist, to supply narcotic drugs to narcotic addicts, not for the treatment of bona fide patients but to satisfy the craving of addicts for their drug of addiction. The physician wrote fraudulent prescriptions which the pharmacist filled. The evidence showed that sometimes the physician left the prescriptions undated so that they might be dated by the pharmacist in such a way as to present a record that would not excite the suspicion of the narcotic inspectors. A witness for the government, a narcotic addict who claimed to be suffering from myocarditis and amebic dysentery but was able to carry on his usual occupation, testified that on week ends he traveled from his home to defendant Heller's office and returned, a distance of 180 miles each way, in order to secure prescriptions for morphine which he had filled by the co-defendant pharmacist. Forty-three prescriptions, signed by Dr. Heller, which purported to have been issued for "incurable chronic angina and chronic amebic dysentery" were introduced in evidence. An expert medical witness for the government testified that a patient suffering from myocarditis whose condition justifies the use of morphine should be at absolute rest in bed. In answer to a hypothetical question, this expert witness further testified that the use of morphine was not justified in the case of a person suffering from myocarditis whose condition was such that he was able to carry on his usual occupation and travel 360 miles each week end. In his opinion morphine is used in cases of myocarditis to relax the patient and to take as much load off the heart as possible, but for this purpose the use of a drachm (4 Gm.) every six or seven days would be indicated only in a "rather rare case." On this evidence the defendants were convicted of a conspiracy to violate the Harrison Narcotic Act. The pharmacist was admitted to probation, but the physician was sentenced to prison and so he appealed to the United States circuit court of appeals, fourth circuit.

Defendant Heller's contention, that the government's expert medical witness had not taken into account the fact that the patient was a morphine addict when he expressed his opinion as to how much morphine was proper in the treatment of myocarditis, did not meet with the approval of the circuit court of appeals. The mere fact, said the court, that a patient supposed to be suffering from myocarditis was making trips of 360 miles each week end to secure a prescription for morphine spoke so loudly as to the real situation existing that any testimony as to proper dosage for such an ailment would hardly be noticed. The court concluded that the conviction of violation of the Harrison Narcotic Act was amply sustained by the evidence. Accordingly, the judgment of conviction was affirmed.—*Heller v. United States*, 104 F. (2d) 446.

Medical Practice Act (Florida): Constitutionality; Revocation by Board on Criminal Charge Not Barred by Court Acquittal.—De Gaetani, a physician, was prosecuted and acquitted in a criminal court on a charge of criminal abortion. Subsequently the Florida state board of medical examiners, pursuant to authority granted by the medical practice act of Florida and after a hearing in a county other than that in which the alleged criminal offense occurred, revoked the physician's license to practice medicine. From an order of the circuit court, Dade County, denying the petition of the state, on the relation of the physician, for a writ of certiorari to review the action of the board, and in effect ordering a trial de novo, the relator appealed to the Supreme Court of Florida.

The appellant physician contended that his acquittal by a criminal court of the charge of criminal abortion was an absolute bar to any proceeding by the state board of medical exam-

iners to revoke his license. The Supreme Court conceded that there is a division of authority on this question but believed the better reasoned rule to be, as it had recently announced in *State ex rel. Sbordy v. Rowlett* (Fla.), 190 So. 59, that an acquittal in a criminal prosecution will not bar a proceeding by the board to revoke a physician's license based on the same offense. It was not necessary that the hearing of the board be held, as the appellant argued, in the county where the cause of action accrued. In the judgment of the court, the medical practice act was not unconstitutional because it does not in terms provide a means for summoning and enforcing attendance of witnesses. In refutation of the appellant's further contention that the act was unconstitutional because in the trial de novo it does not accord the accused a jury trial, the court pointed out that the appellant had not requested such a trial and, furthermore, the proceeding before the board was not a criminal prosecution and was not therefore an action in which the appellant was constitutionally entitled to a trial by jury. The judgment of the lower court was therefore affirmed.—*State ex rel. De Gaetani v. Driskell et al., State Board of Medical Examiners (Fla.)*, 190 So. 461.

Governmental Hospitals: Liability for Failure of Hospital Attendants Properly to Supervise Inmates.—In two cases the court of claims of New York held that the state was liable in damages for the negligence of attendants at a state psychiatric hospital in failing properly to supervise inmates of the institution. In one case the patient was gored to death by a bull and in the other case the inmate hung himself. Both patients were suffering from dementia praecox and in each case the attendant knew of the inmate's low mentality and suicidal tendencies. In the opinion of the court in each case the amount of damages recoverable was dependent on the pecuniary loss actually sustained by the surviving widow or children. But, in view of the fact that in each case the medical testimony showed that the patient had been suffering from an incurable disease and would never have been able to contribute financial assistance to his family had he lived, the court held that the surviving heirs had sustained no pecuniary loss other than the cost of burial. Accordingly, the court in each case limited recovery to the amount of reasonable funeral expenses.—*Dimitroff v. State (N. Y.)*, 13 N. Y. S. (2d) 458; *Gaccione v. State (N. Y.)*, 18 N. Y. S. (2d) 161.

Society Proceedings

COMING MEETINGS

- American Academy of Pediatrics, Memphis, Tenn., Nov. 18-20. Dr. Clifford G. Grulee, 636 Church Street, Evanston, Ill., Secretary.
- American Clinical and Climatological Association, White Sulphur Springs, W. Va., Oct. 28-30. Dr. Francis M. Rackemann, 263 Beacon St., Boston, Secretary.
- American College of Surgeons, Chicago, Oct. 21-25. Dr. Frederic A. Besley, 40 East Erie St., Chicago, Secretary.
- American Society of Tropical Medicine, Louisville, Ky., Nov. 12-15. Dr. E. Harold Hinman, Malaria Control Division, Wilson Dam, Ala., Secretary.
- Central Society for Clinical Research, Chicago, Nov. 1-2. Dr. Carl V. Moore, Washington University School of Medicine, St. Louis, Secretary.
- Clinical Orthopaedic Society, Milwaukee and Madison, Wis., Oct. 18-19. Dr. Myron O. Henry, 825 Nicollet Ave., Minneapolis, Secretary.
- District of Columbia, Medical Society of the, Washington, Oct. 15-17. Mr. Theodore Wiprud, 1718 M St., N.W., Washington, Secretary.
- Indiana State Medical Association, French Lick, Oct. 29-31. Mr. Thomas A. Hendricks, 23 East Ohio St., Indianapolis, Executive Secretary.
- Inter-State Postgraduate Medical Association of North America, Cleveland, Oct. 14-18. Dr. W. B. Peck, 27 East Stephenson St., Freeport, Ill., Managing Director.
- New York State Association of Public Health Laboratories, Albany, Nov. 1. Miss Mary B. Kirkbride, New Scotland Avenue, Albany, Secretary.
- Omaha Mid-West Clinical Society, Omaha, Oct. 28-Nov. 1. Dr. J. D. McCarthy, 107 South 17th St., Omaha, Secretary.
- Pacific Coast Society of Obstetrics and Gynecology, San Francisco, Nov. 6-9. Dr. T. Floyd Bell, 400 Twenty-Ninth St., Oakland, Calif., Secretary.
- Radiological Society of North America, Cleveland, Dec. 2-6. Dr. Donald S. Childs, 607 Medical Arts Bldg., Syracuse, N. Y., Secretary.
- Southern Medical Association, Louisville, Ky., Nov. 12-15. Mr. C. P. Loranz, Empire Bldg., Birmingham, Ala., Secretary.
- Southwestern Medical Association, Tucson, Ariz., Nov. 21-23. Dr. M. P. Spearman, 1001 First National Bank Bldg., El Paso, Texas, Secretary.
- Western Surgical Association, Topeka, Kan., Dec. 6-7. Dr. Albert H. Montgomery, 122 South Michigan Blvd., Chicago, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Heart Journal, St. Louis

20:129-260 (Aug.) 1940

- Esophageal Pulse Under Normal and Abnormal Conditions. A. C. Taquini, Buenos Aires, Argentina.—p. 129.
- *Prodromal Pain in Coronary Occlusion. B. Blumenthal and J. A. Reisinger, Washington, D. C.—p. 141.
- Simultaneous Mechanograms and Electrograms from Intact Human Subject, with Notes on Effects of Distention of Stomach on Conventional Electrocardiogram: Preliminary Report. C. A. Johnson and G. H. Laing, Chicago.—p. 160.
- Predominance of Surface Over Deep Cardiac Injury in Producing Changes in Electrocardiogram. B. Kisch, L. H. Nahum and H. E. Hoff, New Haven, Conn.—p. 174.
- Relation Between Bundle Branch Block and Cardiac Enlargement. A. M. Master, H. Kalter, S. Dack and H. L. Jaffe, New York.—p. 186.
- Examination of Heart and Lungs by Cardiocirculographic Method. I. S. Hirsch, New York.—p. 195.
- Effect of Aminophylline on Peripheral Blood Flow. H. J. Stewart and N. B. Jack, New York.—p. 205.
- Dissecting Aneurysm: Report of Nineteen Cases, with Review of Recent American Literature. L. F. Holland, Austin, Texas, and R. H. Bayley, New Orleans.—p. 223.

Prodromal Pain in Coronary Occlusion.—Blumenthal and Reisinger discuss the prodromal pain that occurred spontaneously, without obvious cause, and always preceded definite manifestations of coronary occlusion. Histories of thirty-two patients revealed that twelve had experienced such attacks for varying periods before the severe manifestations recognized as coronary occlusion occurred. Nine of the thirty-two patients died, one of whom was in the "prodromal" group. The mechanism of the production of the "prodromal" pain in this case is discussed in the light of pathologic anatomy. The duration, character and length of the prodromal period of pain varied from patient to patient. Generally the attack appeared suddenly, without obvious precipitating causes, when the patient was apparently in good health. The pain usually developed while the patient was at rest. The attacks of five patients were associated with exertion, but in these instances the pain either was not relieved by cessation of the exercise or began after the exercise was stopped. Nine patients were able to do fairly strenuous work without discomfort on the same day on which they had spontaneous attacks of pain. One patient had attacks of angina of effort which were relieved promptly by rest, but he also had other pain which he himself differentiated from angina of effort, which was not associated with exercise, emotional excitement or eating. The pain varied in duration from fifteen minutes to hours and from a mild ache to extreme severity. It was variously described as burning, gnawing, constricting, toothache-like, gripping, aching, swelling, and crushing. The character of the pain remained constant during the prodromal period, but its severity, duration and area involved increased with succeeding attacks. Usually the pain was referred to the anterior chest wall between the midclavicular lines. Ultimately it was always located in this area. The pain of three patients did not involve the chest primarily; severe aching and weakness of the left arm, intermittent pain in both shoulders for a week before the coronary occlusion and pain in the left elbow for six days preceded the onset of pain in the chest. One patient had had pain in the left shoulder for three years. Pain and extreme weakness in one or both upper extremities associated with the premonitory manifestations were noticed by six patients. Subsequent events indicated that the peripheral pain and weakness were related to the changes in the heart and coronary arteries. Between prodromal attacks the patients felt well, except for transient

weakness. Four patients were examined between attacks and no signs of myocardial infarction were found. Electrocardiograms of three patients showed no changes typical of coronary occlusion. The authors discuss the mechanisms that may be responsible for prodromal pain. They believe that of the many factors which contribute to it intramural hemorrhage may be an important one.

American Journal of Public Health, New York

30:859-1022 (Aug.) 1940. Partial Index

- Alabama's Contribution to Public Health. J. N. Baker, Montgomery, Ala.—p. 859.
- Methods of Exposing Experimental Animals to Virus Infection Through Mosquito Vectors. R. A. Kelsner, Washington, D. C.—p. 866.
- Importance of Tabulating Multiple Causes of Death. T. A. Janssen, Washington, D. C.—p. 871.
- Public Health Aspects of Unrestrained Advertising. K. E. Miller, Washington, D. C.—p. 880.
- Federal Works Agency and Public Health. J. M. Carmody, Washington, D. C.—p. 887.
- Nutrition and Health in Pasadena. H. Borsook and W. L. Halverson, Pasadena, Calif.—p. 895.
- How Can the Health Officer Make Greater Use of the Health Education Specialist? I. C. Riggan, Richmond, Va.—p. 921.
- Is Health News Fit to Print? K. W. Grimley, Birmingham, Ala.—p. 925.
- Services for Crippled Children Under Social Security Act. R. C. Hood, Washington, D. C.—p. 935.
- Coordination of Educational Programs of All Health Workers. Reba F. Harris, Louisville, Ky.—p. 938.
- Study of Epidemic of Brucellosis Due to *Brucella Melitensis*. I. F. Huddleson and Myrtle Munger, East Lansing, Mich.—p. 944.

Am. J. Roentgenol. & Rad. Therapy, Springfield, Ill.

44:161-324 (Aug.) 1940

- Pulmonary Complications of Acute Renal and Perirenal Suppuration. R. M. Nesbit and V. S. Dick, Ann Arbor, Mich.—p. 161.
- Roentgen Recognition of Synovium. R. W. Lewis, New York.—p. 170.
- Calcification in Abdominal Neuroblastoma: Report of Two Cases. P. B. Parsons and L. Platt, Durham, N. C.—p. 175.
- Causes of Failure of Lung Expansion Following Thoracotomy for Acute Postpneumonic Empyema, with Special Reference to Bronchial Obstruction. L. A. Hochberg, Brooklyn.—p. 178.
- Cranial Osteomas, from Roentgenologic Point of View. C. W. Schwartz, New York.—p. 188.
- Osteopetrosis: Report of Case. B. Vidgoff and G. J. Bracher, Portland, Ore.—p. 197.
- *Comparison of Roentgenography and Duodenal Drainage in Diagnosis of Cholelithiasis. L. Levyn and F. Meyers, Buffalo.—p. 203.
- Echinococcus Cyst of Left Lobe of Liver: Report of Case. L. O. Leader and B. Goldberg, Chicago.—p. 207.
- Nature of Calcified Lesions, with Special Reference to Those in Spleen. H. C. Sweany, Chicago.—p. 209.
- Paradoxical Roentgen Image in Pneumothorax: Result of Pachypleuritis. P. T. Knies, Columbus, Ohio.—p. 230.
- *Deleterious Effects of Deep Roentgen Irradiation on Lung Structure and Function. V. C. Jacobsen, Troy, N. Y.—p. 235.
- Effects of Radiotherapy as Recorded by Serial Color Photography. L. A. Campbell, Saginaw, Mich.—p. 250.
- Treatment of Large Protruding Carcinomas of Skin and Lip by Irradiation and Surgery. H. B. Hunt, Omaha.—p. 254.
- Carcinoma of Anus: Its Incidence, Pathology and Radiation Treatment. I. I. Kaplan and S. Rubinfeld, New York.—p. 265.
- Physical Differences Between Types of Penetrating Radiation. A. H. Compton, Chicago.—p. 270.
- Interstitial Radium Dosage Expressed in Roentgens. Anna Hamann, Chicago.—p. 276.

Roentgenography and Duodenal Drainage in Cholelithiasis.—Levyn and Meyers compared the relative value of x-rays and examination of the duodenal contents in the diagnosis of cholelithiasis in fifty-four cases. The diagnoses were verified by surgical exploration and pathologic examination. Some of the patients were suffering from other diseases, such as hepatic or gastric carcinoma, peptic ulcer, pancreatitis and postoperative adhesions. Cholecystographic examinations were conducted by the oral method, tetraiodophenolphthalein being administered in 4 Gm. doses. Duodenal drainage was performed according to the method of Lyon. The bile obtained from the duodenum was examined microscopically after being centrifuged for pigment and crystals, the presence of which is indicative of stones in the gallbladder and biliary ducts, and for the amount of B bile present. When from 30 to 50 cc. of B bile was obtained the function of the gallbladder was considered normal and conclusions were drawn as to the presence or absence of stones in the gallbladder. When B bile is absent or only a slight trace is recovered after repeated drainage it may be impossible to determine the presence or absence of gallstones. Occasionally pigment and crystals may be found

in the absence of B bile. This is considered indicative of intraductal stones or biliary stasis. The finding of cholesterol crystals or calcium bilirubinate pigment, or both, in the same sediment was considered as evidence of calculi in the biliary tract. The fifty-four cases were divided into two groups: the thirty-three in which gallstones were found and the twenty-one in which gallstones were not found at operation or necropsy. In those cases in which gallstones were found, a positive diagnosis was made roentgenographically by actual demonstration of their shadows in fifteen. Suggestive, but not positive, evidence was observed in three additional cases. The primary films made the positive diagnosis of cholelithiasis in the majority of cases, and cholecystography helped to establish definite evidence of shadows in only three cases, when they were absent on the primary films. The diagnosis of calculi by means of duodenal drainage was positive in twenty-eight of the thirty-three cases. Therefore the positive identification of stone shadows, when present, was accomplished by x-ray examination in 45.5 per cent, while duodenal drainage gave such evidence in 85 per cent. Both methods gave no positive evidence of calculi in three of the thirty-three cases. In no instance of the other group of cases did cholecystography reveal stone shadows, while duodenal drainage indicated gallstones in seven cases when they were not present. The presence of pigment and crystals in individuals without gallstones has been previously reported by Bockus and his co-workers. In five cases, after surgical exploration of the biliary tract and microscopic study of the wall of the gallbladder there was no accountable reason for the presence of pigment and crystals in the duodenal contents. In one the precipitation of pigment could have been explained by the fact that the patient was deeply jaundiced and in another by severe cholecystic disease without stones.

Deleterious Pulmonary Effects of High Voltage Roentgen Irradiation.—Jacobsen records a postmortem study of the case of a man with a clinical diagnosis of cancer of the lung who was subjected to high voltage roentgen therapy over a period of nine years and whose death was undoubtedly the result of the therapy and not of the neoplasm. During the nine years about 15,800 roentgens was given to the right chest. X-ray evidence during this long interval was compatible with cancer of the right lung. There was no significant loss of weight and little evidence of anemia. Frequent roentgenograms showed slowly progressive fibrosis of the right lung, thickening of the pleura, marked elevation and fixation of the diaphragm, narrowing of the intercostal spaces and retraction of the mediastinal structures to the affected side. This syndrome, following prolonged high voltage irradiation, is almost pathognomonic of roentgen pleuropulmonitis. The conversion of lung into scar tissue increased the vascularity of the bronchial lining. This led to frequent hemoptysis, often of alarming proportions. Irradiation aided in stopping these hemorrhages and was often used for this purpose. Thus a vicious circle was established. Death occurred from an acute influenza-like pneumonia sixteen years after his first symptoms, with secondary septicemia and kidney abscesses. Necropsy revealed the right lung to be converted into a structure of fibrous consistency the size of a man's fist. The pleura was about 4 mm. thick and of almost cartilaginous hardness. Atelectasis was present wherever there was enough lung structure for this to occur. Embedded in a dense mass of fibrous tissue just outside the hilus was an epithelial tumor 2 cm. in diameter with a necrotic center and a viable periphery. The diagnosis was therefore correct and the treatment was successful in that it destroyed most of the tumor and held the small remnant in subjection. Just how much of the vascular pulmonary damage was due directly to roentgen irradiation is open to conjecture. The cellular structure of the lung places it in the group of less radiosensitive organs. With the high voltages and deep penetrability of modern x-ray equipment, destruction or inhibition of tumors in the chest is being accomplished, but at the same time changes in the non-tumor containing portions of the irradiated lung are being detected. Generally these are of minor clinical import but many reports are accumulating which indicate a danger which must be appreciated and guarded against. The widespread alteration in pulmonary tissue, of a

kind that greatly decreases pulmonary volume, doubles the work of the opposite lung and increases the chances of infection. An increase in such complications is prophesied unless improvements in radiation technic are forthcoming. Before a roentgenologist gives additional roentgen therapy to a patient, it is mandatory that he be in possession of facts concerning all previous exposures. Neglect in obtaining such information may in the future lay the physician open to the charge of lack of due care.

American Review of Tuberculosis, New York

42:155-296 (Aug.) 1940

- Case Finding with Fluoroscopic Roentgenography. E. Bridge, Rochester, N. Y.—p. 155.
- Mental and Nervous Phenomena in Tuberculosis. E. F. Conlogue, Auberry, Calif.—p. 161.
- Bronchial Asthma and Pulmonary Tuberculosis. E. Urbach and A. Loew, Philadelphia.—p. 174.
- *Pleural Effusion in Pneumothorax. R. T. Eng, Fort San, Sask.—p. 183.
- Tuberculin Reactions: Comparison of Reactions to Standard and Increased Initial Doses of Tuberculin. L. R. Jones, Philadelphia.—p. 191.
- Tuberculosis on Small Thickly Populated Indian Reservation. L. R. Jones, Philadelphia.—p. 197.
- *Tuberculin Tests and Roentgenograms: Correlation on 1,000 Adults. P. D. Crimm, W. L. Potts and Gwen S. Hudson, Evansville, Ind.—p. 203.
- Tuberculin Tests: Qualitative Reactions with Intermediate Strength of Purified Protein Derivative in 1,000 Adults. P. D. Crimm, Gwen S. Hudson and P. A. Bunn, Evansville, Ind.—p. 209.
- Tuberculosis Mortality and Industrialization, with Special Reference to the United States: Part II. G. Wolff, Baltimore.—p. 214.
- Fatality Rates for Reported Cases of Tuberculosis. G. E. Harmon, Detroit.—p. 243.
- Toll of Tuberculous Infection. E. Bogen, Olive View, Calif.—p. 253.
- Experimental Tuberculosis in Dog: I. Cutaneous Sensitivity to Tuberculin in Dog. Charlotte A. Colwell and M. A. Mills, Chicago.—p. 259.
- Id.: II. Comparison of Old Tuberculin and Purified Protein Derivative in Intracutaneous Tests. Charlotte A. Colwell and M. A. Mills, Chicago.—p. 271.
- Tuberculous Cavities: Their Location and Prognostic Significance. R. Charr, J. W. Savacool and B. Gordon, Philadelphia.—p. 277.

Pleural Effusion in Pneumothorax.—Eng states that of 394 consecutive pneumothorax cases 269, or 68.3 per cent, formed fluid which remained a week or more. This was observed on fluoroscopic examinations performed at intervals of from three to fourteen days. The fluid formed within the first three months in 50.5 per cent, within six months in 67.1 per cent and within a year in 85.6 per cent. The incidence of fluid was greatest in far advanced cases, less in the moderately advanced and least in the minimal. Therefore a great number of effusion cases can be safely avoided by establishing pneumothorax in early lesions. Of the forty-nine deaths in the cases under consideration, fluid developed in forty and only two of these did not show far advanced lesions. Empyema developed in forty-nine of the 134 cases in which aspiration was done. The empyemas of twenty-one cases were aspirated and irrigated with physiologic solution of sodium chloride until the fluid withdrawn was clear and then from 10 to 50 cc. of azochloramid 1:3,300 or the same amount of azochloramid in triacetin 1:500 was injected. Aspirations were done at weekly intervals. The twenty-one patients tolerated the former solution well, having no reaction most of the time or but a mild degree of pain and fever for from a few hours to one day following the injection, whereas the four patients given the latter solution had either a marked elevation of temperature or considerable pain and showed no improvement after six or more treatments. With the 1:3,300 solution the pus gradually became thinner, less in quantity and finally either disappeared entirely or was replaced by a small amount of clear straw colored fluid in eighteen cases. Constitutional improvement occurred, the toxic symptoms of empyema disappeared and appetite and weight increased gradually.

Tuberculin Tests and Roentgenograms.—Crimm and his colleagues state that 1,000 adults of native stock from 16 to 70 years of age were divided into two groups and given intracutaneous tuberculin purified protein derivative tests. Roentgenograms were made of reactors and nonreactors alike. The first group of 553 individuals were given 0.00002 mg. of purified protein derivative intracutaneously; 429 of the 553 were negative to this dose at forty-eight hours and were then given 0.001 mg. of purified protein derivative. The second group of 447 individuals were tested simultaneously in one arm with

0.00002 mg. of purified protein derivative and in the other with 0.001 mg. The incidence of contact cases was 13.6 per cent; 76.7 per cent of all the cases showed evidence of previous tuberculous infection either by the tuberculin test and/or by the roentgenogram. Two active cases were found in the entire series. Of the total cases showing evidence of tuberculosis, 72.1 per cent were found by the tuberculin test and 69.9 per cent through x-ray study. If only the tuberculin test had been employed the incidence of infection would have been 55.3 per cent, and if the x-ray examination had been the only procedure it would have been 53.5 per cent. However, since only two active cases were found, the experiment shows that mass examination by the tuberculin test and x-ray study of the adult is quite expensive in this locality. One of the active cases could have been found through adequate follow-up work because of a history of contact. The other person consulted a physician two weeks prior to the test and would ultimately have been admitted to a sanatorium. Therefore this method of case finding is too expensive for the results it gave. As follow-up work on discharged patients from sanatoriums, the recording of all patients and contacts with state boards of health, the isolation and quarantine of open cases by health officials and earlier diagnosis on the part of the medical profession, together with education of the public, are necessary in a complete case-finding program, the authors believe that efforts should be centered on these projects rather than on mass x-ray examination and mass tuberculin testing. Tuberculin testing of special groups is valuable as an educational program, even though its case-finding efficiency is limited.

Archives of Neurology and Psychiatry, Chicago

44:483-700 (Sept.) 1940

- Vascularization and Vulnerability of Cornu Ammonis in Opossum. E. Scharrer, New York.—p. 483.
- Constitutional Differences Between Deteriorated and Nondeteriorated Patients with Epilepsy: IV. Handwriting. H. A. Paskind and M. Brown, Chicago.—p. 507.
- Action Potentials of Muscles in Athetosis and Sydenham's Chorea. P. F. A. Hoefer and T. J. Putnam, New York.—p. 517.
- *Spontaneous Cerebral Ventriculostium. W. H. Sweet, Chicago.—p. 532.
- One Hundred Cases of a Condition Diagnosed as Acute Encephalitis: Clinicopathologic Study. Alexandra Adler, Boston.—p. 541.
- *Comparative Study of Metrazol Treatment and Control Observations of Schizophrenia. J. Notkin, F. J. DeNatale, C. E. Niles and G. Wittman, Poughkeepsie, N. Y.—p. 568.
- Spastic Pseudosclerosis (Disseminated Encephalomyelopathy; Corticopallidospinal Degeneration): Familial and Nonfamilial Incidence: Clinicopathologic Study. C. Davison and A. M. Rabiner, New York.—p. 578.
- Myelodisculoneuritis with Cell-Protein Dissociation. D. Shaskan, H. A. Teitelbaum and L. D. Stevenson, New York.—p. 599.
- Vestibular Reactivity in Schizophrenia. A. Angyal and N. Blackman, Worcester, Mass.—p. 611.
- Physiologic Aspects of Schizophrenic Withdrawal. A. Angyal, H. Freeman and R. G. Hoskins, Worcester, Mass.—p. 621.
- Subarachnoid and Intracranial Hemorrhages Due to Metrazol. H. N. Roback and C. W. Miller Jr., Medical Lake, Wash.—p. 627.
- Defective Closure of Neural Tube: Case of Involvement of Central Olfactory, Trigeminal Mesencephalic, Visual Reflex, Auditory and Cerebellar Systems. H. S. Rubinstein, Baltimore, and W. Freeman, Washington, D. C.—p. 636.

Spontaneous Cerebral Ventriculostium.—Sweet reports two instances of spontaneous development of an opening between the third ventricle or the lateral ventricles and the external surface of the brain. Such openings develop as a consequence of expansion of the cerebral ventricles when the flow of cerebrospinal fluid is obstructed. In the only other case reported in the literature the obstruction took place at the aqueduct of Sylvius. In the author's second case the block was at the same site, and in his first case the obstruction was due to an enormous teratoid tumor in the posterior cranial fossa. The first patient, a woman of 54, was admitted to the hospital in an extremely confused mental state. She dated all her symptoms to two days previously. A history of symptoms beginning twelve years previously was obtained from her family and her physician. A diagnosis of probable right cerebral glioma was made and the patient was discharged. Within a few weeks the defects in her memory and gait had practically disappeared and she was apparently well for nine years, when she was found unconscious on the sidewalk. Despite the unusual history, the marked cerebellar signs and calcification strongly suggested a neoplasm, but pneumo-encephalographic examination or suboccipital exploration was not carried out

because of the patient's poor general condition. She also presented hypertension, bronchopneumonia and pyuria; acute pulmonary edema and hyperpyrexia developed four days after entry, and the patient died the next day. Necropsy revealed a midline cerebellar teratoid tumor with moderate secondary hydrocephalus and rupture through the lamina terminalis. The author believes that the complete subsidence of symptoms for nine years is probably to be correlated with the abnormal opening in the lamina terminalis. It was unlikely that this was an artefact. The possibility that the subsidence of the symptoms was due to spontaneous rupture of the cystic tumor is not tenable, as there was no evidence of cystic contents in the subarachnoid space. Also the tumor was multilocular, and it is unlikely that enough locules would have broken simultaneously to cause all symptoms to disappear. The author believes that the nine years of freedom from symptoms was due to the spontaneous development of a third ventriculostium. This favors the similar operative procedure recommended by Dandy and by Stookey and Scarff for relief of hydrocephalus from occlusion of the aqueduct of Sylvius. The ventriculostium continued patent and functioning for nine years and was apparently still effective at the time of death. In the other case, in a boy of 15, in which there was a spontaneous ventriculostium, the hydrocephalus was not relieved as no communication was established with the subarachnoid space. Because of marked involvement of the posterior cranial nerves and cerebellar seizures and signs, the clinical diagnosis was between a cerebellar and a metencephalic tumor. Postmortem study was restricted to the brain, and the primary source was found to be a tumor of the brain stem. A conspicuous nodule of it lay in the midline of the tectum of the midbrain, between the superior colliculi and occluding the rostral portion of the aqueduct of Sylvius. The signs of involvement of the structures in the posterior fossa were due not only to their invasion by the tumor but to the fact that they were not given the usual protection by the tentorium cerebelli; there was in effect a large fluid tumor in the upper part of the posterior fossa. The widely dilated pupils which gave no reaction to direct light constituted the only sign of destruction of tissue in the tectum mesencephali by the tumor. The boy's obesity and retardation of sexual maturity were ascribed to secondary pressure on the hypothalamus and pituitary gland with the resultant atrophy. The extensive destruction of nerve tissue precluded any attempt to localize the site of origin of terminal cardiovascular attacks.

Comparison of Metrazol and Control Treatment of Schizophrenia.—Notkin and his co-workers present the results obtained in schizophrenic patients treated with metrazol and those given injections of physiologic solution of sodium chloride. The control patients were kept in bed in the same ward with the patients treated with metrazol. The study is based on the treatment of fifty men and fifty women with metrazol, thirty-four men and thirty-seven women controls and twelve men and three women who recovered or improved while awaiting treatment. The duration of the psychosis was more than eighteen months in 78 per cent of patients in the treated group, in 84.5 per cent of the control group and in only 13.4 per cent of the patients who improved spontaneously. The patients were followed for from six months to one and a half years after the termination of treatment or control observation. Of the 100 treated patients, 18 per cent showed various degrees of improvement. One man died of an abscess of the lung which developed after the thirteenth convulsion. The remaining eighty-one patients failed to show any change in their mental condition. Of the patients who improved, seventeen were released and two have had relapses and were returned to the hospital. Of the seventy-one control patients, six (8.4 per cent) showed various degrees of improvement and sixty-five failed to improve. Five of these improved patients were discharged and two have had relapses and have been returned to the hospital. Of the fifteen patients who improved spontaneously, one had a relapse while still in the hospital and two others have had relapses after their release. None of the treated or the control patients recovered. Recoveries occurred in 14.3 per cent of the patients showing spontaneous improvement. Patients with a shorter duration of the psychosis had

longer remissions. The patients in both groups who improved were younger than the patients who did not improve. The convulsive threshold was lower in women. The paranoid and the catatonic types of psychoses were equally represented in the improved treated patients, while in the control group the catatonic type predominated. The paranoid type predominated in both groups of unimproved patients, as it did in the group who improved spontaneously. All patients who improved showed a gain in weight. From one to seven temporomandibular dislocations during convulsions were encountered among fourteen patients. An incomplete fracture of the femur and a dislocation of the humerus occurred in two other patients. A transitory rise of blood pressure and an increase in pulse rate followed all convulsions.

Archives of Surgery, Chicago

41:569-812 (Sept.) 1940

- Effect of Cholecystogastrostomy on Cinchophen-Produced Ulcer in Dogs. H. Swan, Denver.—p. 569.
- Metabolism of Vitamin K and Role of Liver in Production of Prothrombin in Animals. J. W. Lord Jr., W. D. Andrus and R. A. Moore, New York.—p. 585.
- *Clinical Investigations of Some Factors Causing Prothrombin Deficiencies: Significance of Liver in Their Production and Correction. W. D. Andrus and J. W. Lord Jr., New York.—p. 596.
- Influence of Fusion of Spine on Growth of Vertebrae. S. L. Haas, San Francisco.—p. 607.
- Extensive Plexiform Neurofibromatosis of Scalp and Pinna. R. Meyers, Brooklyn.—p. 625.
- Leiomyoma of Round Ligament. C. W. Mayo and G. B. Schunke, Rochester, Minn.—p. 637.
- Ectopic Pregnancy: Its Relation to Diagnostic Problems of General Surgeon. G. Zechel, Chicago.—p. 646.
- Carcinoma of Extrahepatic Bile Ducts. H. L. Stewart, Bethesda, Md.; M. M. Lieber and D. R. Morgan, Philadelphia.—p. 662.
- *Metaplasia in Breast. R. L. Oliver, Savannah, Ga.—p. 714.
- Serum Proteins and Wound Healing. H. Koster and A. Shapiro, Brooklyn.—p. 723.
- *Fuchs Test for Malignancy. C. S. Robinson, R. Evers and A. Truex, Nashville, Tenn.—p. 730.
- Bacillus Pyocyaneus Osteomyelitis of Spine: Report of Case of Successful Treatment with Sulfanilamide. A. J. Schein, New York.—p. 740.
- Incomplete Indirect Inguinal Hernias: Study of 2,462 Hernias and 2,337 Hernia Repairs. H. J. Shelley, Fort Worth, Texas.—p. 747.
- Cerebral Complications Following Surgical Operations: II. Factors Which Predispose to Cerebral Anoxia. A. Behrend and Helena E. Riggs, Philadelphia.—p. 772.
- Preoperative Diagnosis of Torsion of Pedicle of Spleen: Report of Case with Splenectomy Followed by Recovery. C. Romiti, Georgetown, British Guiana.—p. 781.
- Seventy-Second Report of Progress in Orthopedic Surgery. J. G. Kuhns, R. J. Joplin, W. A. Elliston, G. Bailey, J. A. Reidy, Boston; J. E. Milgram, New York; F. E. Ilfeld, Los Angeles, and R. Perlman, Cincinnati.—p. 788.

Factors Causing Prothrombin Deficiencies.—Andrus and Lord studied the plasma prothrombin levels in two groups of cases with disorders of the biliary tract and other conditions associated with deficiencies in the clotting component. In the first series twenty-two patients were found to have low prothrombin levels and were treated with vitamin K (klotogen or cerophyl) and bile salts (bilon). With this therapy and transfusions for some of the patients, hemorrhage ceased when it was present at admission or its subsequent occurrence was prevented except in one patient who died. This patient had a carcinoma involving the bile passages and died from a massive hemorrhage from an ulcer on the posterior aspect of the duodenum which had eroded into the pancreaticoduodenal artery. This patient's prothrombin level had previously been low but had responded to treatment and at the time of the hemorrhage was normal. Quite obviously the bleeding was unconnected with any prothrombin deficiency. Since October 1939 the authors have used the synthetic vitamin K, 2-methyl-1, 4-naphthoquinone, intramuscularly for thirty-eight cases with prothrombin deficiencies, with strikingly successful results in the absence of damage to the liver. When it is given by injection, the presence of bile salts in the intestinal tract is not necessary for its absorption, and its effect is evident within a few hours. The clinical effectiveness of vitamin K may be diminished or even abolished in the presence of severe hepatic damage. Two cases are cited to illustrate the influence of hepatic damage on the level of plasma prothrombin and on the response to vitamin K. One was a case of thrombosis of the hepatic artery and the other of marked cirrhosis. Vitamin K medication had no effect here on the prothrombin level.

Metaplasia of Breast.—Comprehensive review of the literature, according to Oliver, revealed no reference to pavement epithelium of primary origin in the mammary gland. He reports three such cases and reviews the physiology of the breast and abnormalities associated with faulty cyclic processes described by Oliver and Major as cyclomastopathy. The pavement type of epithelium in the three cases was deeply embedded in growths of cyclomastopathic origin and could not have been the result of the growing over of surface epithelium, which must be ruled out in all cases of suspected metaplastic processes. The presence of pavement epithelium in such a growth bears out the contention that mechanical stimuli may aid in inaugurating metaplastic processes. Whether embryonal displacement, simple retrogression or direct metaplasia is responsible for the change is a theoretical question. The fact that the change has taken place and is associated with changes similar to metaplasia must be considered. The variation from the glandular to the pavement type of cell indicates that the process is an indirect one, transitional changes being necessary for the transformation, as against the direct process, in which a specialized cell or tissue is changed into another specific cell or tissue without intermediate stages. Such an abrupt change was not seen in any of the sections. The author's views on the possible mechanisms by which metaplasia and its associated processes may be brought about are: 1. In consideration of the derivation of metaplastic processes from a germinal cell or tissue, certain cells of the original germinal stock from which the specialized cell or tissue is derived may remain undifferentiated, though in their development they are carried along with the differentiated cells. 2. In the growth of cells or a tissue toward a certain specialization, there is a possibility that some cells may be retarded in their differentiation and may remain so, as do the completely undifferentiated cells in the specialized tissue. These cells may also develop along lines foreign to the site and thus appear different from those of the tissue considered. 3. The transformation of one specialized cell or tissue into another different specialized cell or tissue is doubtful and rarely, if ever, occurs in a direct manner, although the possibility must be considered.

Fuchs Test for Cancer.—Robinson and his associates employed the Fuchs test in 200 cases for the diagnosis of malignant conditions. They obtained seventy-four negative reactions in cases in which evidence of a malignant process was not to be found. The presence of a malignant tumor was suspected among ten but the growth was proved on biopsy to be benign. There were a number of negative values corresponding to Fuchs's "immune reaction," most of which were too small to be significant. In fifty-six cases of proved malignant tumor the Fuchs reaction was positive. The interest of the test lies in the wide variety of tumors which give positive reactions. The test gave negative reactions in some patients who either had or had previously had proved malignant tumors. The majority of these patients had undergone some therapy, after which the tumor showed no signs of recurrence. If it is assumed that the Fuchs reaction would have been positive prior to treatment, the effects of therapy are rather prompt. In one instance (sarcoma of the jaw) a negative reaction was obtained as soon as six days after operation, while in another case (squamous carcinoma of cervix) it was not negative until eight months after operation and high voltage roentgen therapy. At the time the test was negative and one week later this patient was much improved. That the test measures the activity of the malignant growth is indicated by a case of carcinoma of the breast. On admission the patient was found to have extensive carcinomatosis with metastases to the bones and other structures. At this time her blood gave a positive Fuchs reaction. She was pregnant and was delivered by cesarean section. No treatment was given for the malignant tumor. Two months later her blood gave a negative reaction. At this time she was much improved; she had gained weight and there was marked retrogression of her osseous lesions. However, several months later she died. There were twenty-seven patients whose blood gave negative reactions. These patients were cured, were under treatment or had lesions in the early stages of growth. There were also eighteen cases for which no explanation appears and the results of the Fuchs test must be assumed to be genuine false negative reactions. Five posi-

tive Fuchs reactions were obtained in spite of the fact that pathologists failed to find malignant tissue. The authors present data on thirteen cases in which no microscopic examination was made. Their experience has not confirmed that of other investigators that false negative reactions are seldom obtained but that false positive reactions may be obtained in a number of conditions, notably syphilis and tuberculosis. They feel that the accuracy of the method could be increased by improving the quality of the substrate and by frequent checking of its activity. The limitations of the test are that: 1. The growth must be more than six months old. 2. The patient should not have been operated on or have received radium or roentgen treatment for at least a month. 3. The tumor must be in a period of active growth.

Arkansas Medical Society Journal, Fort Smith

37:75-92 (Sept.) 1940

Tuberculin Patch Test: Comparative Study of Vollmer Patch Test and Mantoux in 200 Cases. R. E. Weddington and W. O. Arnold, Fort Smith.—p. 75.
Reciprocal Relations of Ophthalmologist and General Practitioner. M. Wiener, St. Louis.—p. 78.

Canadian Public Health Journal, Toronto

31:357-406 (Aug.) 1940

Preventive Medicine in General Practice. G. Fleming, Montreal.—p. 357.
*Vaccination Against Tuberculosis with BCG Vaccine. J. A. Baudouin, Montreal.—p. 362.
Pioneers in Tuberculosis Work in Canada. G. D. Porter, Toronto.—p. 367.
Active Immunization by Intranasal Route: Comparison of Various Haemophilus Pertussis Antigens. Ruth P. Dow, Montreal.—p. 370.
Antitoxin Response to Concentrated Diphtheria Toxoid Applied to Nasal Mucous Membrane. D. T. Fraser, E. L. Davey and K. C. Halpern, Toronto.—p. 376.
Social Work with Boys. K. H. Rogers, Toronto.—p. 381.

BCG Vaccination Against Tuberculosis.—Baudouin summarizes the eleventh annual report of the subcommittee on tuberculosis of the National Research Council dealing with the value of the BCG vaccine against tuberculosis. The report is based on 20,000 vaccinations accumulated during eleven years. Appraisal of the immunity conferred by the Calmette-Guérin vaccine considered the comparative mortality and morbidity figures observed in 725 vaccinated (ages from under 12 months to 13 years) and 1,178 unvaccinated children all living in contact with sputum-positive persons and indicated a 51 per cent total mortality balance in favor of the vaccinated group and a favorable morbidity rate of 47 per cent. Judged by the duration of the immunity conferred, vaccinated children were found to possess a greater resistance to tuberculosis than the unvaccinated: for children under 12 months by 71 per cent, from 1 to 2 years by 54 per cent, from 2 to 3 years by 86 per cent, from 3 to 4 years by 66 per cent and from 4 to 5 years by 33 per cent. The decline in mortality, though regularly favoring the vaccinated group, was not as uniform as was expected. This is attributed to the small number of deaths in both groups (eleven and fifty-eight respectively). Among 9,000 vaccinated children born into or living in families free from tuberculosis and ranging up to 13 years of age, no negative reactions occurred. None of the 275 deaths that occurred among them were due to tuberculosis. The report recommends BCG vaccination for all children, especially for those born into a contaminated environment. Infants were always vaccinated during the first ten days after birth. Protection against tuberculosis afforded by the vaccine is stated to last for two or more years.

Florida Medical Association Journal, Jacksonville

27:57-112 (Aug.) 1940

The Medical Man and the Florida Workmen's Compensation Act (1935). E. L. Scott, Ocala.—p. 69.
Impetigo Contagiosa Complicated by Hemorrhagic Nephritis: Case Report. H. E. Palmer, Tallahassee.—p. 73.
Spontaneous Hemorrhage of Ovary. J. S. Turberville, Century.—p. 75.
Endocrinology of Menstruation: Review of Recent Literature. L. W. Dowlen, Miami.—p. 79.
Emergency Procedures in General Practice. R. Britt, St. Augustine.—p. 84.
Garlic: Occupational Factor in Etiology of Bronchial Asthma: Case Report. G. E. Henson, Jacksonville.—p. 86.
Eugenic Sterilization in Florida. Lydia Allen DeVilbiss, Miami.—p. 87.
Low Back Pain: Backalgia. E. L. Jewett, Orlando.—p. 89.

Georgia Medical Association Journal, Atlanta

29:385-430 (Aug.) 1940

Crawford Williamson Long. J. A. Farley, Washington, D. C.—p. 385.
Dr. Crawford W. Long: Pioneer in Medical Research. W. H. Myers, Savannah.—p. 388.
Medical Horizons. J. K. Quattlebaum, Savannah.—p. 390.
Salyrgan-Theophylline by Mouth: Report of One Case. L. M. Blackford, Atlanta.—p. 397.
Use of Salyrgan-Theophylline Suppositories in Congestive Heart Failure. T. S. Claiborne and R. B. Logue, Atlanta.—p. 399.
Prevention of Infection by Air-Borne Bacteria of Operative Wounds. D. Hart and R. Jones Jr., Durham, N. C.—p. 401.
Tuberculosis of Bladder. S. T. Brown, S. R. Brown and F. B. Hodges, Atlanta.—p. 405.
Hyperactive Carotid Sinus Reflex: Report of Case. R. F. Slaughter, Augusta.—p. 408.
Congenital Preauricular Fistula. J. D. Martin Jr., Atlanta.—p. 411.
Treatment of Summer Diarrhea in Infants: Preliminary Report. H. E. Teasley, Hartwell.—p. 413.

Journal of Immunology, Baltimore

39:89-170 (Aug.) 1940. Partial Index

In Vitro Anaphylaxis in Surviving Intestine. P. A. Nicoll and D. H. Campbell, Chicago.—p. 89.
Studies on In Vitro Anaphylaxis and Release of Active Nonhistamine Material from Sensitized Guinea Pig Lung. D. H. Campbell and P. A. Nicoll, Chicago.—p. 103.
Studies with Clostridium Chauvoei (Blackleg) Aggressin. I. Live, Philadelphia.—p. 137.
Studies on Antipneumococcus Rabbit Serum: II. Relation Between Mouse-Protective Units and Precipitin Nitrogen. T. D. Gerlough, J. W. Palmer and R. R. Blumenthal, New Brunswick, N. J.—p. 163.

Journal of Investigative Dermatology, Baltimore

3:251-346 (Aug.) 1940

Changing Causal Concepts and Investigative Methods. J. H. Stokes, Philadelphia.—p. 257.
Attempts to Prove Specificity of Streptococci Isolated from Nasopharynx of Patients with Psoriasis. R. R. Kierland, Rochester, Minn.—p. 273.
Sensitivity to Rat Hair. A. Romanoff, New York.—p. 287.
*Tattooing (Puncturation) with Mercury Sulfide and Other Chemicals for Treatment of Pruritus Ani and Perine: Further Investigations. R. Turell, New York.—p. 289.
Experiments with Histaminase. F. A. Simon, Louisville, Ky.—p. 299.
Acne Vulgaris: Failure to Demonstrate a Relation to Staphylococcal Infection. F. W. Lynch, Minneapolis.—p. 305.
Nutritional Approach to Experimental Dermatology: Introduction and Review of Literature. M. Sullivan and Jane Nicholls, Baltimore.—p. 309.
Id.: Nutritional Dermatoses in the Rat: I. Vitamin B₆ Deficiency. M. Sullivan and Jane Nicholls, Baltimore.—p. 317.
Id.: II. Skin Changes in Rats Deficient in Entire Vitamin B Complex Other Than Thiamine. M. Sullivan and Jane Nicholls, Baltimore.—p. 337.

Tattooing for Pruritus Ani and Perine.—Turell points out that the rationale of therapeutic tattooing with mercuric sulfide is still undetermined but that the mechanical trauma produced by tattooing without the use of mercuric sulfide is ineffectual for the permanent control of pruritus ani. His experience with thirty-seven cases warrants the extension of this treatment. At present he tattoos not only those patients with intractable pruritus ani of long standing who failed to respond to established therapeutic measures but also patients who have pruritus ani that is recalcitrant to treatment regardless of the duration of the lesion and the few so-called psychoneurotic patients with cutaneous perianal changes consistent with pruritus ani. Selection of patients is important, as results show that tattooing with mercuric sulfide is apparently ineffective for pruritus that is primary in the perineum and posterior vulva but effective in those cases in which there was a spread of the pruritus from the posterior to the anterior perianal areas involving the perineum and the posterior portion of the vulva. The treatment has thus far proved of little value for pruritus vulvae either of undetermined origin or with superimposed dermatitis. Tattooing with mercuric sulfide is done in the presence of inflammatory and infectious disease of the preformed anal ducts, anal glands and the crypts of Morgagni. All anal lesions are always eradicated prior to tattooing. Redundant perianal skin, even in the absence of anal lesions, is removed to facilitate tattooing. Operation and tattooing are never done at one sitting because the primary operation may control the pruritus and because in the presence of open wounds the mercuric sulfide may get into the subcutaneous tissues and form mercuric proteinate, which is toxic because it is gradually absorbed. Among the

thirty-seven cases treated there were three cases of recurrence following tattooing but in no instance was the recurrent anal pruritus as intense as the original. In one of these there was also present a transient bilateral scaly dermatitis in the tattooed perianal region and an intermittent bilateral irritation caused by oil or grease laden clothes. These two factors were bilateral in distribution and, as the recurrent pruritus was unilateral, the author believes that an insufficient deposit of mercuric sulfide in the skin may have been responsible for the recurrence. The itching was very mild and inconsequential in character in the two other patients and treatment directed to the associated or underlying anal lesions (excision of an infected crypt and topical medication of a fissure) caused the pruritus to disappear. Studies now in progress appear to show that a pharmacodynamic degenerative effect on the cutaneous terminal nerve supply is produced by tattooing with mercuric sulfide which alters the capacity of the terminal nerve network to respond to adequate stimuli. The author believes that a critical attitude should be maintained until a large series of treated cases have been observed for a long time.

Journal of Pediatrics, St. Louis

17:143-278 (Aug.) 1940

- Glucose Tolerance Test in Celiac Disease: Significance of Low Blood Sugar Curves. C. D. May and J. F. McCreary, Boston.—p. 143.
- Primary Carcinoma of Liver, with Banti's Syndrome. Vida B. Wentz and K. Kato, Chicago.—p. 155.
- *Involvement of Nervous System in Sickle Cell Anemia. J. G. Hughes, L. W. Diggs and C. E. Gillespie, Memphis, Tenn.—p. 166.
- Phlyctenular Conjunctivitis: Quantitative Details of Desensitizing Treatment in Sixteen Children. P. J. Howard, Detroit.—p. 185.
- Sporotrichosis: Report of Case. D. H. Fogel and D. W. Martin, Durham, N. C.—p. 193.
- Bronchiectasis Following Atelectasis in Tuberculosis of Infancy: Role Played by Enlarged Glands and Granulation Tissue. J. G. Hughes and W. L. Simpson, Memphis, Tenn.—p. 197.
- *Hypertension in Diphtheria. I. Rosenbaum Jr., Louisville, Ky.—p. 210.
- Diphtheria Treated with Sulfanilamide: Report of Case. H. D. Bowman, Hagerstown, Md.—p. 218.
- Treatment of Meningitis Due to Haemophilus Influenzae (Pfeiffer's Bacillus): Review of 108 Cases. J. W. Lindsay, E. C. Rice and M. A. Selinger, Washington, D. C.—p. 220.
- Influenzal Meningitis: Case Report. E. M. Sirlin, Mishawaka, Ind., and A. H. London, Durham, N. C.—p. 228.
- Ten "Good" Eaters and Ten "Poor" Eaters: Developmental Background and Behavior Relevant to Nutrition and Health of Group of Nursery School Children. Jeanette B. McCay and Helen D. Bull, Ithaca, N. Y.—p. 230.
- The Child's History as Aid in Psychiatric Treatment of Children. G. H. J. Pearson, Philadelphia.—p. 241.

Nervous System in Sickle Cell Anemia.—Hughes and his collaborators present six cases of sickle cell anemia with cerebral complications, review the literature and discuss the pathologic changes. From the records of their cases and from twenty-five culled from the literature it seems that neurologic manifestations are frequent, the lesions are multiple and the location of the lesions is variable. The onset of symptoms is often sudden and extensive enough to cause grave manifestations such as convulsions, meningeal signs, pains, aphasia, paralyzes, coma and death. The prognosis following central nervous system lesions is poor, varies widely and is unpredictable. Frequently there are patients who have recurrent episodes in whom the symptoms and signs are referable to the nervous system. In these cases there is a tendency for the later attacks to be more severe. The cerebrospinal fluid observations are variable and often normal, although the patient has definite neurologic signs. Fluids which on first examination were normal may later become abnormal. The abnormalities of the cerebrospinal fluid consist of increased pressure, sickled erythrocytes, xanthochromia and protein and leukocyte increases. The cerebral lesions are varied and widespread. It is the authors' opinion that the central nervous system lesions are primarily intravascular. The most common changes found at necropsy are dilatation of peripheral blood vessels and congestion with sickled erythrocytes. Multiple thrombosis of smaller blood vessels in the same area is the rule. Other vascular lesions in the small vessels include infiltrative and degenerative changes in the vessel walls, perivascular edema, cellular exudation, hemorrhage and necrosis. The changes in the larger arteries and arterioles include intimal proliferation, fragmentation and reduplication of the intima, medial fibrosis

and hyalinization, and sometimes hemorrhage into the media, with pigmentary changes and calcification. The cortical and convolutional gray matter and to a less extent the white matter adjacent to it are involved. The spinal cord has been studied inadequately, but the meager evidence available reveals meningeal and vascular lesions and degenerative changes in ganglion cells comparable to those found in the cerebral cortex. The presence of elongated and multipointed sickled erythrocytes, the increase of leukocytes, nucleated red blood cells, macrocytes and platelets and in some cases venous back pressure due to obliterative changes in the arterioles of the lung and myocardial failure increase the normally slow blood flow through the small vascular channels of the cortex. The arterial changes are interpreted as being secondary to capillary and venous thrombosis. The pathologic observations correlate well with the clinical manifestations. The milder symptoms (headache, drowsiness, dizziness, minor meningeal irritation and temporary sensory and motor symptoms and signs) are probably explainable on the basis of vascular stasis and small thrombi with good collateral circulation. Confusion psychoses, mental changes, convulsions, aphasia, hemiplegia, paresthesias, delirium and coma may occur with more extensive lesions. Dilated vessels, occasional hemorrhages, edema of the fundi, localized facial swelling, dilated and thickened and tortuous temporal vessels, bulging fontanels and relief of headache following epistaxis indicate that cerebral stasis is present. The severe joint and osseous pains complained of commonly are probably due to vascular lesions, inflammatory reaction and irritation of nerve endings in these tissues. Some severe back pains and neck stiffness interpreted as meningeal may be articular in origin or due to lesions in tendons and muscles. Some severe chest and abdominal pains and pains in the skin and extremities are probably referred pains which are primary in the central nervous system or spinal ganglions. There is no specific therapy.

Hypertension in Diphtheria.—Rosenbaum reports two cases of hypertension occurring in the course of postdiphtheritic paralysis. The blood pressure increased as the paralysis progressed and gradually decreased as the paralysis cleared. Von Kiss was the first to observe hypertension in uncomplicated cases of diphtheria. He also reported an elevation of blood pressure in four of six fatal cases of postdiphtheritic paralysis. Clinical and electrocardiographic signs of severe cardiac damage were present in all the patients. They died with symptoms of cardiac failure, and at necropsy degeneration of cardiac muscle was demonstrated. There has been much speculation concerning the etiology of blood pressure changes in diphtheria. On the basis of their animal experiments Romberg, Passler, Brulius and Muller believed that in the acute phase of diphtheria the cause of death lay in paralysis of the vasomotor center in the medulla, with a consequent fall in blood pressure. They claimed that vasomotor paralysis, not myocardial weakness, was the chief cause of circulatory failure. According to this concept hypotension is due to toxic injury to the vasomotor center, and hypertension is caused by its stimulation. The explanation of hypertension through increased cerebral pressure and consequent marked compression of the medullary centers would be completely understandable. The experiments of Friedemann, who found increased spinal fluid pressure without increased protein or cells as a constant symptom in severe diphtheria, support this concept. However, Von Kiss and Horanyi were unable to demonstrate anatomic changes in the vasomotor centers. They felt that the vegetative nervous system of human beings, guinea pigs and horses did not have affinity for diphtheria toxin. Attempts to correlate the pathologic urinary changes in some cases of diphtheria with changes in blood pressure have shown no relationship. Rosenbaum believes that in these cases a neurologic etiology would seem most tenable. He cites three cases reported by Salus. In the two patients who survived, the hypertension, marked lability of pressure, tachycardia and increased respirations came on with the ascending paralysis when the bulbar symptoms appeared, and they gradually cleared as the paralysis improved. Muller and Nordmann encountered a similar case in which a lesion was found in the substantia reticularis grisea to which the hypertension was attributed. The author says that these cases of paralysis with hypertension bear a striking resemblance to his two cases

of postdiphtheritic paralysis. In all of them the symptoms of hypertension came on at the same time as the paralysis and gradually cleared as the paralysis improved. As all these patients showed either hypoglossal or vagal paralysis, the hypertension might be due to irritation of the neighboring glossopharyngeal nerve, such as is seen in glossopharyngeal neuralgia. This reflex is mediated through the carotid sinus.

Journal of Pharmacology & Exper. Therap., Baltimore

69:273-384 (Aug.) 1940. Partial Index

- Pulmonary and Urinary Excretion of Paraldehyde in Normal Dogs and in Dogs with Liver Damage. H. Levine, A. J. Gilbert and M. Bodansky, Galveston, Texas.—p. 316.
- Action of Synthetic Antispasmodics "Trasentin" and "Trasentin-6H." J. D. P. Graham and S. Lazarus, Glasgow, Scotland.—p. 331.
- Toxicity, Treponemoidal Activity and Potential Therapeutic Utility of Substituted Phenylarsenoxides: I. Methods of Assay. H. Eagle, Baltimore.—p. 342.
- Chemotherapy of Experimental Hemolytic Streptococcus Infections with Gold Salts. M. H. Dawson and Gladys L. Hobby, New York.—p. 359.
- Absorption and Excretion of Sulfapyridine and of Sodium Sulfapyridine in Man. H. D. Ratish, A. Davidson and J. G. M. Bullock, New York.—p. 365.

Journal of Thoracic Surgery, St. Louis

9:583-700 (Aug.) 1940

- Sulfanilamide and Experimental Tuberculosis in Guinea Pig. H. C. Ballou, A. Guernon and M. A. Simon, Montreal.—p. 584.
- Pedicle Muscle Flap in Treatment of Bronchial Fistulas: Report of Sixteen Cases. C. Crafoord and P. Linton, Stockholm, Sweden.—p. 606.
- Neurofibromatosis with Sarcomas in Lungs. M. Louria, M. Lederer and Liselotte Herz, Brooklyn.—p. 612.
- Evaluation of Pulmonary Function Tests in Determination of Risk Prior to Thoracic Surgery. R. Adams, Boston.—p. 623.
- *Thoracoplasty in Treatment of Pulmonary Tuberculosis: Review of 100 Consecutive Cases. A. F. Miller, V. D. Schaffner and J. E. Hiltz, Kentville, Nova Scotia.—p. 634.
- Renal Failure as Complication of Cardiac Tamponade: Report of Case. E. S. Stafford, Baltimore.—p. 652.
- Mechanical Aids to Collapse Therapy. W. H. Oatway Jr. and J. W. Gale, Madison, Wis.—p. 656.
- Anomalies of Lungs, with Special Reference to Danger of Abnormal Vessels in Lobectomy. H. A. Harris, Cambridge, England, and I. Lewis, London, England.—p. 666.
- Fibroma of Esophagus: Report of Case. N. R. Barrett, London, England.—p. 672.
- Diffuse Polypoid Laryngotracheobronchitis: Preliminary Note on Endoscopic Curettage. P. C. Samson, Oakland, Calif.—p. 679.
- Situs Inversus, Sinusitis and Bronchiectasis. D. B. Cole and W. L. Nalls, Richmond, Va.—p. 689.

Thoracoplasty for Pulmonary Tuberculosis.—Miller and his colleagues discuss their experience with 245 thoracoplasty stages or operations necessary for 100 consecutive patients with parenchymal disease. There were twenty-six cases complicated by tuberculous empyema and two by a persisting pleurisy with effusion. One was an oleothorax case and one a pneumothorax which would not reexpand. Seventy-five per cent of the patients operated on were between 20 and 40 years of age. Only thirty-five of the cases were strictly unilateral, while sixty-five presented bilateral disease; twenty-one required contralateral collapse procedures. The disease was moderately advanced in only 20 per cent of the patients. Thoracoplasty was performed on the right side in forty-four cases and on the left side in the remainder. The disease was predominantly exudative on the operative side in 25, exudative and productive in 70 and productive in 5 per cent. In sixty-five cases the disease was present in the opposite lung. Cavitation was present in eighty-three of the 100 cases, confined to one lobe in seventy-eight. Complete closure was effected in sixty-four of the eighty-three cases. The results of thoracoplasty indicate that contralateral disease is no contraindication to thoracoplasty, provided it is not extensive or unstable or that it is brought under control by some form of collapse. There was little or no difference in the ultimate result whether the disease was contralateral or not; 85 per cent of both classes showed definite improvement, whereas 50.8 per cent of the former and 43 per cent of the latter were apparently arrested or apparently cured. Contralateral compression should be considered as a means of preparing serious cases with bilateral disease for thoracoplasty operation. Thoracoplasty should not be instituted only as a last chance measure but should be considered

for good risk patients, when the disease is unilateral or at most slight in amount and well fibrosed in the contralateral lung. In good risk patients the disease is inactive and the patient's general condition is good. The smaller cavities were more easily and more frequently closed than the larger ones, which also holds true in other forms of collapse therapy. The likelihood of complete closure is greater in the thinner walled cavities. A good mechanical result does not always mean that the patient is free of symptoms or bacilli. However, none of the patients with good mechanical results (73 per cent) have died. The ones that were not cured or arrested were converted from a state of "poor chronicity" to one of "good chronicity" or with the passage of time they may be cured. On the whole, the patients with cavities did better than those with no cavities, with the exception of the mortality rate. If the empyema cases are eliminated, the noncavity cases lead by a good majority. The results were slightly better among patients with negative sputum, but so little better that it is somewhat surprising. The chance of a good mechanical result was lessened, as was also the chance of a good clinical result, as the delay between operative stages lengthened. The usual interval between operations was two weeks. Practically as good results were obtained among the older cases as in those of shorter duration. However, the best results were obtained in those patients whose disease existed for less than a year. There were eleven deaths, and only six were classified as operative deaths. Contralateral spread of the infection occurred in fifteen patients and wound infection in five; other mild or serious complications occurred in thirteen. The authors hope that, now that spinal anesthesia is being used rather extensively, the number of spreads will be reduced materially. The cause of spread, they believe, is usually due to failure to cough up secretions immediately after operation, with resultant pooling in the opposite lung. Thoracoplasty has left something to be desired, as only nine patients can be classified as cured, forty as arrested and thirty-six as improved. Only four were not improved by operation, and as eleven died the operation was unsatisfactory in fifteen.

Kentucky Medical Journal, Bowling Green

38:363-422 (Sept.) 1940

- Common Sense in Handling Behavior Problems of Childhood. A. J. Alexander, Lexington.—p. 412.
- Anemia as a Public Health Problem. H. Gordon, Louisville.—p. 415.
- Rosacea-like Tuberculid of Lewandowsky. W. U. Rutledge, Louisville.—p. 417.

Laryngoscope, St. Louis

50:703-796 (Aug.) 1940

- Rhinology in Children: Résumé of and Comments on Literature for 1939. D. E. S. Wishart, Toronto.—p. 703.
- Impaired Hearing in School Children. S. R. Guild, L. M. Polvogt, H. R. Sandstead, W. E. Loch, Ella Langer, Mary H. Robbins and W. A. Parr, Baltimore.—p. 731.
- Clarification of Certain Phases of Physiology of Hearing. H. Davis, Boston.—p. 747.
- Clinical Objectives in Chemotherapy of Hemolytic Streptococcus Infections. C. Lyons and R. N. Ganz, Boston.—p. 756.
- New Amplifier Having Characteristics Similar to Those of Human Ear, and Its Application to the Problem of Deafness. F. H. Shepard Jr., Merchantville, N. J.—p. 767.
- Treatment of Deafness. L. K. Guggenheim, West Los Angeles, Calif.—p. 773.
- Cresatin in Laryngology and Otology. M. D. Lederman, New York.—p. 784.

Nebraska State Medical Journal, Lincoln

25:321-356 (Sept.) 1940

- Clinical and Roentgenologic Manifestations of Low Back Pain. I. H. Lockwood, Kansas City, Mo.—p. 321.
- Diseases of Right Upper Quadrant of Abdomen. A. F. Tyler, Omaha.—p. 327.
- Importance of Adequate Treatment of Fractures of Foot. J. E. M. Thomson, Lincoln.—p. 331.
- Exogastric Pedunculated Myosarcoma of Stomach. O. R. Platt, G. F. Waltemath and J. H. Millhouse, North Platte.—p. 336.
- Acute Appendicitis. J. D. Bradley, Pender.—p. 338.
- Sacrocoecal Chordoma: Case Report. W. F. Bowers, Omaha.—p. 341.
- Pulmonary Embolism from Superficial Vein Thrombosis. C. Franden, Omaha.—p. 343.

New England Journal of Medicine, Boston

223:265-306 (Aug. 22) 1940

- Is Thiamine the Antineuritic Vitamin? A. P. Meiklejohn, Boston.—p. 265.
- *Observations on Pruritus Ani. G. S. Speare and R. E. Mabrey, Boston.—p. 274.
- *Treatment of Gonococcal Infection in Women: Comparison of Results With and Without Sulfanilamide Therapy. W. M. Brunet, J. B. Salberg and R. A. Koch, Chicago.—p. 277.
- Treatment of Arthritides of Known Origin. W. Bauer and C. L. Short, Boston.—p. 286.

Observations on Pruritus Ani.—Speare and Mabrey discuss the various treatments tried in 175 cases of pruritus ani encountered during the last four years at the Rectal Clinic of the Massachusetts General Hospital. The age of the patients varied from 18 to 80 years. There was only one patient less than 20 years of age, while the third, fourth, fifth and sixth decades were about equally represented. The ratio of men to women was almost 2:1. The reason for this is probably the more scrupulous hygiene that women employ after defecation. The duration of symptoms varied from one week to thirty years. Local disease, which consisted chiefly of internal hemorrhoids and external skin tags, was present among 40 per cent of the patients. Cutaneous itching in other parts of the body was complained of by nineteen of the 175 patients. There is no specific treatment for pruritus ani, and therefore every patient should be treated individually by one method or a combination of several methods. Scrupulous hygiene is of paramount importance. This includes washing with soap and warm water after every defecation, and thorough drying without excessive rubbing. Various soothing, astringent, antiseptic, keratolytic or antipruritic topical medicaments were used. Most patients respond to one or another of these. Many simple early cases can be cured with nothing more than careful hygiene. Acute stages of erythema, excoriation and vesication without chronic cutaneous changes can be made to disappear in one or two weeks by the daily application of tincture of metaphen. Even patients with signs of an acute dermatitis superimposed on chronic cutaneous changes should be so treated. For chronic cases showing thickening and cutaneous discoloration without superimposed acute irritation, keratolytic and antipruritic ointments should be used. The application of salicylic acid and sulfur ointment is effective. Scrupulous hygiene and continued use of this or a similar ointment may bring about permanent improvement. When all simple treatments fail some form of subcutaneous injection is resorted to in order to interrupt the afferent sensory pathways. Forty-eight patients required injection treatment. For eighteen a solution containing quinine and urea hydrochloride and procaine hydrochloride was used, an oil-soluble anesthetic for sixteen and alcohol for fourteen. Injection treatment should not be carried out in the presence of acute exacerbations. Of the injection measures 70 per cent alcohol injected subcutaneously gave the best results. Roentgen therapy was used for four patients; one obtained relief for seven weeks, one for three weeks, one had no relief and one had partial relief for a year.

Treatment of Gonococcal Infection in Women.—Brunet and his associates compare the results of 241 gonorrheal infections in women treated with silver proteinate instillation and local treatment with the results among 241 similar cases in which sulfanilamide and local treatment were given. The study shows that the latter management halves the distressing pelvic complications and reduces the treatment period by a third. There was an increase in the number of abscesses of Bartholin's gland, but the authors can give no satisfactory explanation for this finding. The reactions to sulfanilamide were numerous but usually of a minor nature. Seventeen per cent of the patients were unable to take 40 grains (2.6 Gm.) of the drug without disturbing reactions. However, the patients who were able to take only 20 grains (1.3 Gm.) of sulfanilamide daily made almost parallel progress with those taking larger doses. The authors have no satisfactory explanation for this observation, unless the concentration of the drug in the blood does not have the significance previously attributed to it in relation to the control and cure of gonorrhea.

North Carolina Medical Journal, Winston-Salem

1:371-462 (Aug.) 1940

- Sprue in North Carolina. F. M. Hanes, Durham.—p. 371.
- Thoracoplasty with Apicolysis. C. R. Monroe, Pinehurst; C. D. Thomas and C. L. Gray, Sanatorium.—p. 375.
- Gout. H. C. Thompson, Shelby.—p. 379.
- Acute Disseminated Encephalomyelitis. E. A. MacMillan, Winston-Salem.—p. 382.

Public Health Reports, Washington, D. C.

55:1419-1472 (Aug. 9) 1940

- Incidence of Cancer in Pittsburgh and Allegheny County, Pennsylvania, 1937. A. J. McDowell.—p. 1419.

55:1473-1516 (Aug. 16) 1940

- Evaluation of Mouse Test for Standardization of Immunizing Power of Antirabies Vaccines. K. Habel.—p. 1473.
- *Helium-Oxygen Mixtures for Alleviation of Tubal and Sinus Block in Compressed Air Workers. J. W. Crosson, R. R. Jones and R. R. Sayers.—p. 1487.
- Two Epizootics of Plague Infection in Wild Rodents in the Western United States in 1938. L. B. Byington.—p. 1496.

Helium-Oxygen Mixtures for Tubal and Sinus Block.—Crosson and his co-workers encountered in a course of a field study on compressed air illness a by-product, namely ear block or tubal and sinus block. Helium-oxygen mixtures are a means for its relief. This subjective complaint of pain or discomfort in the ears is a distinct entity encountered in compressed air work and is entirely separate from compressed air illness. Armstrong and Heim observed the same condition in aircraft pilots. In compressed air workers the condition may advance to a frank otitis media if the block is not relieved promptly. The ears may not be involved, but an obstruction of one or more of the ostiums of the accessory nasal sinuses may produce severe pain in the area of the affected sinus. The only objective sign in sinus block may be slight nasal bleeding. If relief is not afforded, the pain continues and an acute sinusitis is likely to develop. Tubal and sinus blocks are most commonly encountered in workers with infection of the upper part of the respiratory tract. In "locking in" the compressed air worker must consciously or unconsciously continuously equalize the pressure in his accessory sinuses and middle ear. Many workers swallow while locking in, but the majority use the Valsalva method, closing the nose and mouth tightly and attempting to expire forcefully, thus increasing the pressure in the pharynx and forcing air up to the middle ear by way of the eustachian canal. If one man of a gang acquires a "block," the intruding air must be shut off at once and the pressure lowered. Then a second try is made and, if not successful this time, the worker must leave the lock. This fluctuation of the pressure often precipitates a "block" in one or more men of the gang attempting recompression after the first worker has been "locked out." Oftentimes, rather than lose a shift or be ridiculed by his mates, a worker will "force himself through," by enduring the pain and discomfort in the hope that it will soon right itself. These are the cases in which otitis media, often with subsequent suppuration, and rupture of the ear drum are more prone to develop. If the worker reports to the physician on duty, a series of shrinking solutions will be placed far back in his nose and throat, which may or may not be efficacious in breaking the block. A method of eliminating these conditions with helium was tried out. A helium-oxygen mixture should diffuse through an accessory nasal sinus ostium or the eustachian tube more rapidly than would the nitrogen of air. Thus the equalization of pressure between the middle ear and the external barometric pressure should occur more readily. A simple apparatus was designed by the United States Bureau of Mines Laboratories which could be used by the worker in the man lock. It consists of a small cylinder of 80 per cent helium and 20 per cent oxygen connected through a small reducing valve to a "lung" or breathing bag. The breathing bag is equipped with an admission valve, and attached to it is a rubber tube with a detachable face mask. The whole apparatus is no larger than a small suitcase and can be left permanently in the man lock in charge of the lock tender. The apparatus is automatic and ready for instant use. The affected worker applies the mask and breathes normally for one minute or more and usually the "block" is broken. He can then go on through either still using the mask or not as necessity demands. The authors believe

that this procedure should save considerable time for the worker and the employer and obviate the danger and discomfort of the disabling tubal or sinus block. The use of this apparatus in the man lock is strongly urged in order to prevent the occurrence of the more serious complications of "block" and also as it will obviate the necessity of fluctuation of pressure which frequently precipitates a "block" in one or more men attempting recompression after the first worker has been "locked out."

Southwestern Medicine, El Paso, Texas

- 24:253-286 (Aug.) 1940

- Practical Procedure in Treatment of Fistulas of Small Intestine. H. G. Williams and W. O. Sweek, Phoenix, Ariz.—p. 253.
Cancer of Stomach. J. S. Horsley, Richmond, Va.—p. 256.
Present Status of Treatment of Urinary Infections. H. C. Bumpus Jr., Pasadena, Calif.—p. 261.
Further Notes on Clinical Aspects of Ultra Short Wave X-Ray. A. Soiland, Los Angeles.—p. 264.

Surgery, St. Louis

8:169-408 (Aug.) 1940. Partial Index

- William James Mayo (1861-1939) and Charles Horace Mayo (1865-1939). D. C. Balfour, Rochester, Minn.—p. 170.
A Personal Appreciation of the Mayos and Their Work. J. M. T. Finney, Baltimore.—p. 176.
The Mayos and Their Work. G. Crile, Cleveland.—p. 179.
Public Opinion and Animal Experimentation. E. C. Cutler, Boston.—p. 182.
Surgical Management of Usual Extrahepatic Biliary Lesions. A. W. Allen, Boston.—p. 188.
*Indications and Results of Pancreatectomy for Hypoglycemia. V. C. David, Chicago.—p. 212.
Portal Circulation and Restoration of Liver After Partial Removal. F. C. Mann, Rochester, Minn.—p. 225.
*With How Little Lung Tissue Is Life Compatible? Report of Patient from Whom All Pulmonary Tissue Except Two Upper Lobes Was Successfully Removed. E. A. Graham, St. Louis.—p. 239.
Surgical Treatment of Primary Duodenal Diverticula. J. J. Morton, Rochester, N. Y.—p. 265.
Problem of Surgical Arrest of Massive Hemorrhage in Duodenal Ulcer: Technic of Closing Duodenum. O. H. Wangenstein, Minneapolis.—p. 275.
Use of Miller-Abbott Tube in Surgery of Large Bowel. A. O. Whipple, New York.—p. 289.
Regional Lymphatic Metastasis of Carcinoma of Rectum. F. A. Collier, E. B. Kay and R. S. MacIntyre, Ann Arbor, Mich.—p. 294.
Use of Rectus Fascia for Closure of Lower or Critical Angle of Wound in Repair of Inguinal Hernia. W. F. Riennhoff Jr., Baltimore.—p. 326.
Current Treatment of Cancer of Lip: Clinical Speculation. V. P. Blair and L. T. Byars, St. Louis.—p. 340.
Arteriosclerosis in Pancreatic Diabetes. L. R. Dragstedt, D. E. Clark, O. C. Julian, C. Vermeulen and W. C. Goodpasture, Chicago.—p. 353.
Progressive Lymphedema Associated with Recurrent Erysipeloid Infections. A. Ochsner, A. B. Longacre and S. D. Murray, New Orleans.—p. 383.

Pancreatectomy for Hypoglycemia.—David discusses the advisability of partial or subtotal resection of the pancreas for hypoglycemia when no neoplasm is found in the part removed. Of eighteen partial resections (from 14 to 28 Gm.) with no tumor, the pancreas of fifteen patients was normal histologically and in three hyperplasia of the islet cells was present. The minimal blood sugar in this group was below 50 mg. per hundred cubic centimeters in fourteen patients. Of fourteen surviving patients only three were free from attacks, three were moderately improved and the attacks of eight continued. Seventeen other patients have had from 35 to 60 Gm. of pancreas removed for spontaneous hypoglycemia. No tumor was found in the resected tissue in these patients. The examination of the pancreatic tissue revealed fourteen normal pancreases, hyperplasia of the islet cells in two and a pancreatitis in one. Eleven of these patients are relieved of the symptoms of hypoglycemia. Seven have been followed for more than two years. There was only one operative death. Of the four unimproved patients, two had a fasting blood sugar of from 65 to 70 mg. per hundred cubic centimeters before the operation and therefore may not strictly belong to the group giving the characteristic Whipple triad of symptoms (attacks of nervous or gastrointestinal disturbances coming on in a fasting state, a hypoglycemia with readings below 50 mg. and immediate relief from the ingestion of dextrose). The author concludes that exploration of the pancreas is indicated in patients with this triad of symptoms in whom extrapancreatic causes of hypoglycemia have been excluded and dietary management has failed. Subtotal resection of the tail and body of the pancreas up to the superior mesenteric vessels is indicated when exploration reveals no tumor.

This operation should be a part of the treatment of spontaneous hypoglycemia until more knowledge of the underlying causes of the condition offers a better solution of the problem.

Lung Tissue Necessary for Life.—Graham reports the removal from a boy of 14, because of bronchiectasis, the two lower lobes, the right middle lobes and the lingula of the left upper lobe. It is generally accepted that the lingula is the homologue of the right middle lobe. Therefore the case represents the removal of four of the six lobes and, according to the literature, is the most extreme example of successful radical removal of pulmonary tissue. Although only two months has elapsed since the completion of the second operation, the boy is able to walk rapidly for short distances without dyspnea and his vital capacity is 1,200 cc. Continued improvement and increase in vital capacity are expected. After the first operation, on the right side the boy's expectoration was decreased by one half and cough was confined to mornings and evenings. Since the second operation there has been no cough or sputum and severe clubbing of the fingers has disappeared. The patient's productive cough followed an attack of pneumonia at the age of 2½ and continued until the second operation, after which there has been no cough or sputum.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Bol. de la Soc. Cubana de Pediatría, Havana

12:309-354 (Aug.) 1940

- *Erythema Nodosum and Tuberculosis in Children. A. Silva.—p. 309.
Curative Effect of Massive Doses of Sulfapyridine in Purulent Hemophilus Influenzal Meningitis: Case. A. Castellanos, E. Galán and F. Hernández Calzadilla.—p. 322.
Hemophilus Influenzal Meningitis Followed by Klebsiella Meningitis: Case. A. Escobar.—p. 341.
Hemophilus Influenzal Meningitis Cured by Sulfathiazole: Case. A. J. Aballi.—p. 349.

Erythema Nodosum.—Erythema nodosum, according to Silva, is now preponderantly regarded as of tuberculous origin. The various criteria employed to determine tuberculous infection—a contaminated environment, positive tuberculin tests, roentgenograms, the detection of bacilli in the nodules and blood and the examination of the gastric contents during fasting—combine to yield corroborative evidence. In one of his eight cases (age level from 11 months to 8 years) the positive Mantoux reaction was delayed for three weeks. The author thinks that x-ray examinations should be regularly performed because of the frequent involvement of lymph node and pulmonary tissue even if the physical examination remains negative. The type of lesion usually found is an epituberculosis, a serofibrinous leukocytic inflammatory reaction occurring about the focus of the tuberculous infection. The prognosis is quite benign. A full bibliography is presented.

Medicina, Mexico City

20:419-442 (Aug. 25) 1940

- *Significance of Asymptomatic Renal Calculus in Anemia. R. Gutiérrez.—p. 419.
Necessity of Pharmacodynamic Study of Mexican Plants. E. C. del Pozo.—p. 438.

Anemia Due to Unsuspected Renal Calculus.—Gutiérrez discusses the etiology of asymptomatic kidney stone, the pathogenesis of secondary anemia and the patient's amelioration following nephrolithotomy, in some cases with complete recovery from anemia and from gastrointestinal symptoms. Case histories, of which seven (age level from 23 to 58) are selected for comment, showed common symptoms and signs of anemia, such as loss of appetite, weight and vigor, gastrointestinal disorders, fatigability, abnormal blood picture and the total failure of antianemic medication, however long sustained, to improve the patient's condition, in the absence of correct diagnosis and surgical intervention. Latent renal concretions, though persisting for years, may remain completely undetected until necropsy. The absence of symptoms, negative results in routine urine examinations, even when one of the kidneys is completely blocked, and negative roentgenograms in the presence of radio-transparent calculi contribute to confuse diagnosis. Some latent calculi can ultimately be determined only by retrograde pyelographic tests. The author reviews the various factors productive

of kidney stone. The degree of severity of secondary anemia depends on the extension, site and duration of the calculus as well as on the type of pathogenic organism involved. Frequently renal calculus is associated with tumor or renal tuberculosis. Most calculi are found in patients with alkaline urine. So-called idiopathic anemia may be due to calculus and its secondary character completely mistaken. The presence of "staghorn calculus" points to a long history of stone formation. The author believes that patients with refractory anemia should be subjected to full urographic examinations. Anemia due to nephrolithiasis is scantily treated in the literature.

Revista Med.-Cir. do Brasil, Rio de Janeiro

48:421-480 (July) 1940. Partial Index

*Perforating Cholecystitis. V. de Angelis.—p. 445.
Preoperative and Postoperative Mental Reactions. Y. dos Guarany's.—p. 463.

Perforating Cholecystitis.—De Angelis reports eight cases of cholecystitis with perforation into the peritoneal cavity. The patients were between the ages of 27 and 30 years, except one, who was over 40. He states that the most frequent cause of this type of perforation is lithiasis and infection of the bile tracts with bacteria of the typhoid or coli groups. The symptoms are those of acute inflammation of the right side of the abdomen from rupture of a hollow viscus. The earlier the operation, the better the prognosis. Peritonitis develops with such rapidity that the majority of the patients are seen in the course of a more or less acute peritonitis. A preoperative diagnosis of rupture can be made from the seat of the lesion, as indicated by the localization of pain and muscle spasm over the gallbladder area, verified by pneumoperitoneum. The treatment consists in cholecystectomy with subhepatic drainage. The author prefers general anesthesia with nitrous oxide or cyclopropane to ether. The latter causes diminution in the secretion of bile. Lack of the flow of bile from the perforation may cause one to overlook the perforation with later effusion of bile taking place into the peritoneal cavity. Cholecystectomy with subhepatic drainage is indicated in obvious perforation of the gallbladder with bile in the peritoneum as well as in spontaneously closed perforation. Cholecystectomy is indicated even in the presence of sterile cultures from bile effusion, since the fluid may become infected later. Cholecystostomy with drainage in cases of spontaneously closed perforation is dangerous, as it may give rise to recurrent perforation.

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*Treatment of Suppurative Lesions with the Balsamic Pack of Vishnevskiy. V. I. Parmenov.—p. 143.
*Transfusion of Cold Conserved Blood. A. N. Glinskiy.—p. 151.

Suppurative Lesions.—Parmenov reports the results obtained in 251 cases of suppurating wounds treated with an ointment proposed by Vishnevskiy. The composition of the ointment is juniper tar 5 parts, bismuth tribromphenate 2 parts and castor oil 100 parts. The ointment appeared to be most effective in the acute, deep and extensive suppurations of soft tissues, such as one sees in perinephric abscess, pectoral phlegmon, intramuscular suppurations of the neck, buttocks or the hand. Rapid detoxification, abundant granulations and sharp decline in the amount of pus were observed as a rule in this group. The ointment was applied in cases of acute hematogenous osteomyelitis with good effect. In pyemia, local treatment with the "balsamic pack of Vishnevskiy" was combined with transfusions of small amounts of conserved blood. Observations in twelve cases of chronic varicose ulcers of the leg demonstrated that the ointment is of little if any effect in the treatment of superficial chronic ulcerating surfaces. The author adhered in the treatment of extensive wounds to the principle of wide exposure under anesthesia and careful and meticulous débridement, after which the wound was gently packed with tampons saturated with the balsamic ointment. No toxic effects on the kidney were noted.

The packs are left undisturbed for from four to nine days depending on the extent and depth of the wound. The author attaches great importance to the immobilization of the suppurating focus in a plaster of paris cast. Physical therapy, streptocid (a sulfonamide), calcium, dextrose and methenamine and blood transfusions in grave cases were regularly employed. The author was impressed with the effect of the ointment on the general condition of the patients, the rapid fall in temperature, excellent granulations, rapid sloughing and healing of the wound. He considers the Vishnevskiy ointment superior in the treatment of extensive suppurations to the method of Carrel-Dakin.

Transfusion of Cold Conserved Blood.—Glinskiy failed to observe any alteration in the respiratory or cardiac function in animals following transfusion of cold conserved blood. He studied the effect on erythrocytes of warming blood conserved in a citrate solution. Portions of blood were warmed to 10 or 12 C., to 20 C. and to 30 and 40 C. Warming the blood to 12 and to 20 C. had no effect on the shape and on the osmotic resistance of the erythrocytes. In preparations of blood warmed to 30 and to 40 C. there were observed changes in the shape and the size of erythrocytes with the appearance of microcytes and shadows of erythrocytes and diminution in their osmotic resistance. The breaking down of the red cells under the influence of the warming up process proceeded parallel with the time of conservation of the blood. Beginning with January 1939 the author had performed 214 transfusions of conserved blood without resorting to warming. The temperature of the blood was from 10 to 12 C. In this group there were 26.1 per cent of clinically manifested reactions as contrasted with 38 per cent of reactions observed by the author in a previous group of 1,400 transfusions of blood which was warmed preliminary to transfusion. The author points out that the method of transfusing conserved blood without warming should be of particular significance in military practice.

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"Uncovertebral Joints" and "Arthrosis Deformans Uncovertebralis." T. Krogdahl and O. Torgersen.—p. 231.
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Ewing's Tumor in Lower Jaw: Two Cases. J. Nielsen.—p. 286.
*X-Ray Examination of Kidney Injuries with Special Regard to Intravenous Urography. I. Hareide.—p. 292.
Division of Lung Segments. E. Huizinga and E. Behr.—p. 314.

X-Ray Examination of Kidney Injuries.—Hareide points out that intravenous urography is indispensable in diagnosing kidney injuries and observing their anatomic nature. The roentgenogram and the urogram both give valuable information. The former enables one to recognize perirenal hematomas or an enlargement of the kidneys in case of subcapsular injuries. The latter gives information about the condition of the renal pelvis and about the respective functioning of the injured and uninjured kidney. The intravenous urogram is not as informative as the retrograde pyelogram but is sufficient as a rule to demonstrate the anatomic changes. Conclusions as to treatment drawn from roentgenologic observations should be compared with the clinical observations. Large perirenal hematomas do not indicate surgical intervention as they seldom endanger life. Likewise contrast mass outside the renal pelvis gives no indication for surgical intervention in case the extravasated urine lies in the kidney parenchyma. Should one observe, on the other hand, the contrast mass outside the kidney, the prospects of spontaneous cure are less encouraging. Cases without contrast mass excretion are the hardest to examine. There are roentgenologic signs that indicate whether the lack of secretion is due to a more or less serious cause. In case the kidney shadow is clear and of normal aspect the lack of secretion cannot be caused by a lesion of the renal artery or an extensive destruction of the renal tissue. The causative factor will most likely lie in the ureter in the form of an impediment to the flow of urine. If on the other hand the roentgenogram reveals a large retroperitoneal hemorrhage there is a possibility that the kidney has been destroyed. In such cases the clinical symptoms will decide whether immediate surgical intervention is necessary or whether one should wait and repeat urography later.

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SHOULD SOLUTION OF POSTERIOR PITUITARY BE USED

IN THE FIRST AND SECOND STAGES OF LABOR?

JOHN A. SHARKEY, M.D.

PHILADELPHIA

The term solution of posterior pituitary employed in this paper includes pituitrin, pitocin, infundin, thy-mophysin, pitanthym and all other preparations depending for their action on the oxytocic principle of the posterior portion of the pituitary gland.

Since its discovery and introduction into medicine, much has been written about solution of posterior pituitary.¹ It is a powerful drug. In addition to its oxytocic and pressor effects, clinical hypersensitiveness has been reported occasionally.²

As the result of investigations of the Maternal Welfare Committee of the Philadelphia County Medical Society over the past nine years and of the Committee for the Study of Stillbirths of the Obstetrical Society of Philadelphia over the past three years, I have collected some data regarding the use and abuse of this uterine stimulant in the first and second stages of labor. This paper summarizes my impression of the use of the drug in normal labor, uterine inertia and complications of pregnancy.

NORMAL LABOR

The use of solution of posterior pituitary in normal labor places a grave responsibility on the physician. He administers it to accentuate pains and hasten delivery with, as Mendenhall remarks, "unfortunately more benefit to himself than to the mother and baby."

The Committee on Fetal Mortality of the Philadelphia Obstetrical Society studied 1,000 stillbirths between Oct. 1, 1937, and March 31, 1939, and found twelve cases in which death of the baby in normal labor could be ascribed to the use of solution of posterior pituitary. In eight of these cases delivery was done in hospitals and in four in the home. Two of these twelve babies showed intracranial hemorrhage at autopsy. In the remaining ten autopsies were not held but the committee, after careful discussion, felt justified in ascribing the deaths to the use of solution of posterior pituitary in labor. It is fair to assume, considering the work of Bundesen and his co-authors,³ that more autopsies would have revealed at least a few more intracranial hemorrhages.

Read before the Section on Obstetrics and Gynecology at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

1. Edgar, J. C.: The Pituitary Extract in Uterine Inertia, *Am. J. Obst. & Gynec.* 68: 20-28 (July) 1913. De Lee, J. B.: Principles and Practice of Obstetrics, ed. 7, Philadelphia, W. B. Saunders Company, 1938. Mendenhall, A. M.: Solution of Pituitary and Ruptured Uterus, *J. A. M. A.* 92: 1341 (April 20) 1929.

2. Simon, E. A.: Hypersensitiveness to Pituitary Extract, *J. A. M. A.* 104: 996 (March 23) 1935.

3. Bundesen, H. N.; Fishbein, W. L.; Dahms, O. A., and Potter, E. L.: Factors Responsible for Failure Further to Reduce Infant Mortality, *J. A. M. A.* 109: 337-343 (July 31) 1937.

Naturally, no method of ascertaining how often these oxytocic preparations were used in the remaining cases in which delivery was done in the city of Philadelphia during the period covered by the report, but there is unmistakable evidence of an occasional neonatal death resulting from their use in normal labor.

The following hospital delivery is illustrative:

Mrs. M. N., aged 28, had one previous normal delivery. Labor began at 1:10 p. m., Sept. 24, 1937, and progressed slowly but normally until 11 a. m. the following day. A left occipito-anterior position with four fingers' dilatation of the cervix was found on examination, and the attending obstetrician administered 0.75 cc. of solution of posterior pituitary at 11:18 a. m. After one long, continuous hard uterine contraction, accompanied by a heavy flow of blood, the head with intact membranes crowned at the vulva. The membranes were ruptured manually and the child was born twenty-one minutes after the administration of 0.75 cc. of solution of posterior pituitary. The child was in poor condition, difficult to resuscitate and edematous and had rapid grunting respirations, high pitched cry, contracted, nonreactive pupils, restlessness and twitching. Severe cyanosis and atelectasis developed. The baby died the following day. Cerebral cranial traumatism, partial atelectasis and aspiration pneumonia were disclosed at autopsy.

Dugger,⁴ in reviewing ninety cases of rupture of the uterus studied by the Maternal Welfare Committee of the Philadelphia County Medical Society, found four cases of ruptured uterus resulting from the use of pituitrin in labor.

The following case from the files of the Maternal Welfare Committee of Philadelphia illustrates what may happen when solution of posterior pituitary is given by the physician with the idea of saving his time:

Mrs. A. C., a white woman aged 36 in her tenth pregnancy, fell into labor at 3 a. m. on Dec. 19, 1937. The patient had arranged for home delivery. She was given an ampule of solution of posterior pituitary at 10 a. m., and after that several attempts were made to apply forceps. Forceps failed and the patient was brought into the hospital at noon because of vaginal bleeding and obstructed labor.

On arrival at the hospital the patient was not in labor, the head was not engaged and the cervix was only 2 cm. dilated. At 6 p. m. the patient was again having good uterine contractions, the head was engaged and the cervix was 6 cm. dilated and fully effaced. By 11 p. m. the head was in midpelvis and the cervix fully dilated, but the uterine contractions had become very weak and irregular. At 7 a. m., December 20, the patient was again having good contractions and the head was almost on the pelvic floor. At 8:15 a. m. the patient complained of severe pain in the right lower quadrant, and labor ceased. The pulse became rapid and the patient showed signs of shock. A diagnosis of ruptured uterus was made and a Porro section performed. During the operation 500 cc. of blood was given. For the first few hours after the operation the patient was in fairly good condition, but during the night she became very distended and began to vomit. Another 500 cc. of blood was given, but the patient became progressively worse and died at 12:30 p. m., December 21. Postmortem examination revealed

4. Dugger, J. H.: Personal communication to the author.

markedly distended intestines with diffuse inflammation of the peritoneal surfaces. The baby weighed 9 pounds 5½ ounces (4,238 Gm.) and x-ray examination showed a compression fracture of the right parietal bone.

This patient probably would have delivered spontaneously if labor had been allowed to progress without interference. It is to be regretted that incidents such as this continue to occur.

Spontaneous labor often causes intracranial hemorrhage in the baby, resulting in stillbirths and neonatal deaths. In the Holland and Lane-Clayton⁵ report 520 spontaneous deliveries, eighty-seven babies had tentorial tears, forty of which occurred in 299 normal vertex presentations. If this is true of spontaneous delivery in which solution of posterior pituitary is not used, how much more must it be true when the uterus is made to contract violently. These violent contractions may occur with even small doses, for when labor starts the uterine muscle is peculiarly sensitive to the action of this drug. When a baby is driven through the birth canal so rapidly that it has no chance to accommodate itself to the various diameters of the pelvis, tears of the falx cerebri and tentorium cerebelli are bound to occur. Again, tetanic contractions of the uterus interfere with placental circulation and with the blood supply of the uterus, resulting in fetal asphyxia and damaging uterine musculature. There is also the danger of deep cervical and perineal lacerations, injuries to the birth canal, premature separation of the placenta, postpartum hemorrhage, shock and collapse and, finally, rupture of the uterus.

However often it has been emphasized that solution of posterior pituitary should not be used in normal labor, there remains the impression that it is in this condition it is used most widely; and the reports of maternal health committees and government agencies confirm this.

UTERINE INERTIA

Uterine inertia is a term used to describe weakness and irregularity or infrequency of uterine contractions during labor. It may be due to mechanical causes or to some deficiency in the uteromusculonervous mechanism, the so-called true primary inertia. It is usually classified as primary and secondary.

1. *Primary Inertia*.—In the past seven years, in a series of 10,241 successive ward and private deliveries in the Misericordia and Fitzgerald-Mercy hospitals, Philadelphia, solution of posterior pituitary was employed in eighteen cases of primary uterine inertia. All the patients were given small doses of pitocin in the first stage of labor before the cervix was fully dilated. All were vertex presentations. There were twelve primigravidas and six multigravidas; the youngest patient was 25 years of age, the oldest 35, the average being 29. Average hours of labor were thirty-five; the average dose of pitocin was 4½ minims (0.27 cc.), the smallest dose was 1 minim (0.06 cc.), the largest was 18 minims (1.12 cc.) given in six doses of 3 minims (0.18 cc.) each. All had operative deliveries. Three were delivered by episiotomy alone, twelve had episiotomy and forceps, four of the forceps operations were midpelvic applications. Seven of the patients were morbid. There was no maternal mortality. One baby was stillborn.

In my opinion, solution of posterior pituitary has a limited but helpful place in the first and second stages of labor complicated by primary inertia. The following case is illustrative:

Mrs. M. O., a primigravida aged 35, was in excellent health but fearful of labor. The head was deep in the pelvis two weeks before delivery. After two and one-half days of weak, irregular pains the cervix was only 2 cm. dilated, effacement was not complete and the membranes were intact. The patient had been adequately rested, but had a temperature of 100 F. Three minims (0.18 cc.) of pitocin was administered. Forceful pains ensued, and in eighteen hours dilatation was complete and delivery accomplished by low forceps. The mother and baby were discharged in good condition on the sixteenth day post partum.

Three of our patients with primary inertia were delivered by cesarean section. One had premature rupture of the membranes and weak, indifferent pains. This patient had a total of 18 minims (1.12 cc.) of pitocin in six doses of 3 minims (0.18 cc.) each at intervals of twenty minutes. After eighteen hours of ineffective labor a cesarean section was performed and myoma uteri revealed as the cause of the inertia. This patient had a stormy convalescence, the abdominal wound breaking down, but she finally recovered.

The second cesarean section was done after the patient had been in labor thirty-two hours and had been given two doses of pitocin of 3 minims (0.18 cc.) each.

The third cesarean section was performed after the patient had been in labor forty-three hours. Four doses of pitocin of 2 minims (0.12 cc.) each were given during labor. The baby was stillborn. At operation it was noted that one-half of the uterus was contracted while the other half was relaxed. The latter two were the only patients in this series with true primary inertia in whom the drug failed completely.

Tollefson and Webb⁶ are enthusiastic regarding the use of solution of posterior pituitary in uterine inertia and state that, "while oxytocics indiscriminately used are dangerous, in this series their efficiency was unquestionable." Garber⁷ is only lukewarm in his attitude. Bell,⁸ after advising rest, enemas and occasionally rupture of the membranes when the os is three parts dilated, states that "the administration of pituitary extract is indicated; it does no harm and in many cases is definitely beneficial." Davis⁹ states, "Rarely is it advisable to give solution posterior pituitary for uterine inertia. If this is done, the dosage should be limited to 1 or 2 minims subcutaneously. This should not be repeated many times." Schumann¹⁰ states that, "if the birth canal is clear for the passage of the fetus which lies in a normal presentation and position, the uterus may be stimulated even though the cervix is not fully dilated and effaced. The only drug here is pituitrin."

The use of solution of posterior pituitary should be limited to cases of true primary inertia. These are the cases in which there seems to be actual weakness of the contractile muscle or of the uteromusculonervous mechanism, though the real cause of the difficulty is still unknown. Cases of normal labor have been reported

6. Tollefson, D. G., and Webb, A. M.: *Uterine Inertia in First Stage of Labor*, West. J. Surg. 45: 156-167 (March) 1937.

7. Garber, Moses: *Diagnosis and Treatment of Uterine Inertia, with Report of One Hundred Cases*, Ohio State M. J. 28: 521-523 (July) 1932.

8. Bell, A. C.: in discussion on Uterine Inertia, Proc. Roy. Soc. Med. 26: 1499-1514 (Oct.) 1933.

9. Davis, M. E.: *The Pharmacopeia and the Physician: The Use and Abuse of Ergot and Pituitary*, J. A. M. A. 109: 1631-1635 (Nov. 13) 1937.

10. Schumann, E. A.: *Textbook of Obstetrics*, Philadelphia, W. B. Saunders Company, 1936.

5. Holland, Eardley L., and Lane-Clayton, Janet E.: *Child Life Investigations: A Clinical and Pathological Study of 1,673 Cases of Dead-Births and Neo-Natal Deaths*, Medical Research Council, Special Report Series, No. 109, London, His Majesty's Stationery Office, 1926.

after presacral sympathectomy, and De Lee¹ mentions a case of Elkins in which a paraplegic patient had a spontaneous delivery. Vaux¹¹ states that this type of inertia is extremely rare. It is likely to occur in elderly primiparas of the nervous emotional type, in elderly multiparas with long intervals between pregnancies, in women whose obesity arises from endocrine dysfunction, in anemic or asthenic women, in chronic invalids, in convalescents from acute infections and in those undernourished from hyperemesis gravidarum. Those women represent a small group as a whole and not all of them will exhibit uterine inertia.

Solution of posterior pituitary should not be used when uterine inertia is due to the following mechanical causes:

- (a) Generally contracted pelvis.
- (b) Abnormal positions of the fetus, as persistent occiput posterior, breech, shoulder, face or deep transverse arrest of the vertex.
- (c) Tumors of the uterine wall or other tumors in or near the uterus blocking the birth canal.
- (d) Congenital anomalies such as bicornate uterus or infantile uterus.
- (e) Abnormal positions of the uterus, as retroflexion or ante-flexion with pendulous abdomen.
- (f) Great multiparity causing thinning of the uterine wall with the danger of spontaneous rupture of the uterus.
- (g) Overdistention of the uterus, as in polyhydramnios, and multiple pregnancies.
- (h) Scars in the uterus from previous operations or disease of the uterine wall.
- (i) Dystocia dystrophica syndrome.
- (j) Rigid cervix, undilatable.

A critical examination of the list of causes just given will show that operative intervention will often be necessary to accomplish delivery and that in the treatment of uterine inertia the underlying condition is the important factor.

2. Secondary Inertia.—In my opinion, solution of posterior pituitary should not be used in secondary uterine inertia when the uterine muscle is exhausted after many hours of hard labor. Sedatives, rest and maintenance of nutrition to prepare the patient for operative delivery or a further test of labor is advisable.

Certainly solution of posterior pituitary has no place in the treatment of Bandl's contraction ring, strictura uteri and tetanus uteri.

When the second stage of labor is unduly prolonged because of the failure of weak uterine contractions to expel the fetus, presentation being normal and rotation completed, it is perhaps wise to terminate labor with low forceps. I realize, however, that in home deliveries, because of lack of facilities, it is not always possible in cases of mild inertia to do outlet forceps operations. Under these conditions solution of posterior pituitary may be used in lieu of forceps, preferably in multiparas, and in doses of 1 or 2 minims (0.06 or 0.12 cc.). In fact, this is the only instance in which the American Committee on Maternal Welfare¹² recommends the use of solution of posterior pituitary in the first two stages of labor.

COMPLICATIONS OF PREGNANCY

1. Toxemias of Pregnancy.—In toxemic patients, solution of posterior pituitary should not be used because of its potential dangers. It has been shown that the

blood pressure may rise an average of 51 mm. of mercury after the misdirected use of the drug in toxemias and that it may reduce diuresis and cause convulsions or pulmonary edema if the patient is edematous.¹³

2. Abruptio Placentae.—Solution of posterior pituitary in conjunction with the abdominal binder has been recommended in the treatment of abruptio placentae. This treatment should be administered only by a skilled obstetrician with sound judgment.

3. Placenta Praevia.—If intrapartum hemorrhage is due to low implantation of the placenta, solution of posterior pituitary will not control the bleeding and the drug should not be given for this purpose.

4. Heart Disease.—Solution of posterior pituitary should not be used in serious heart disease because of the danger of reactions and the added strain placed on the heart should the labor become severe following the injection of the drug.

DOSAGE

The dose of solution of posterior pituitary should always be small and should not exceed 3 minims (0.18 cc.). If one prescribes unit doses, the standard preparations are marketed with 10 international units per cubic centimeter or two-thirds unit per minim. Murphy's¹⁴ studies on the pregnant uterus at term with the Lorand tocograph indicate that, if tetanic contractions are to be avoided, the dose has to be kept below 1½ minims (0.09 cc.), preferably 1 minim (0.06 cc.), and that there should be an interval of thirty minutes between doses.

The drug should be stopped when uterine contractions start. Too violent or long continued contractions must be controlled by the administration of an anesthetic. If the tetanic contractions cause fetal distress and delivery is imminent, labor should be terminated by forceps.

The drug may also be administered as recommended by Hofbauer;¹⁵ i. e., by the use of nasal packs saturated with 0.5 cc. of the solution. The cotton may be removed and the nose flushed with saline solution if the contractions become too violent.

CONCLUSIONS

1. The use of solution of posterior pituitary to accentuate the pains of normal labor and to hasten delivery is to be condemned.

2. Solution of posterior pituitary may be used with care and discrimination:

(a) In certain cases of true primary uterine inertia after having satisfied oneself that no mechanical hindrance to delivery is present.

(b) In lieu of low forceps to terminate labor when the second stage is unusually long because of weak pains and there are no facilities to deliver by forceps.

(c) In abruptio placentae by those who possess sound obstetric judgment and operative skill.

3. The dose should never exceed 3 minims (0.18 cc.) and is preferably 1 minim (0.06 cc.). Intervals between doses should be at least thirty minutes. This dose is not to be repeated if good contractions start.

4919 Walnut Street.

13. Dieckmann, W. J., and Michel, H. L.: Vascular-Renal Effects of Posterior Pituitary Extracts in Pregnant Women, *Am. J. Obst. & Gynec.* 35:131-137 (Jan.) 1937.

14. Murphy, D. P.: The Assay of Posterior Pituitary Extract (Pitocin) on the Pregnant Human Uterus with the Lorand Tocograph, *Am. J. Obst. & Gynec.* 39:808-813 (May) 1940.

15. Hofbauer, J. I., and Hoerner, J. K.: Nasal Application of Pituitary Extract for the Induction of Labor, *Am. J. Obst. & Gynec.* 14:137-148 (Aug.) 1927.

11. Vaux, N. W.: Uterine Inertia, *Am. J. Surg.* 35:358-361 (Feb.) 1937.

12. Adair, Fred L.: *Maternal Care*, Chicago, University of Chicago Press, 1937.

ABUSE OF SOLUTION OF POSTERIOR PITUITARY DURING EARLY LABOR

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I do not favor the use of solution of posterior pituitary during early labor.

Even my opponents admit that large doses at improper times may cause rupture of the uterus. They claim, however, that small doses given when there is no obstruction to hinder fetal advancement are safe and that still smaller doses can be used during the first stage of labor without any harm whatever.

In any labor, regardless of the size of the pelvis, size of the fetus, dilatation of the cervix or station of the presenting part, who can foretell an unobstructed labor? Who can foretell minor, yet serious, abnormal constriction rings, extensions of the fetal head and other fetal disproportions?

Solution of posterior pituitary has a short, powerful contractive action on all smooth muscle. Patients in the preeclamptic states often show small petechial hemorrhages in the muscular coat of arterioles. Is it good mechanics to stimulate such an area with this solution when it is already insulted by disease? To me, this

Occasionally the first dose sensitizes the patient, and a future dose, however small, throws her into extreme shock. This can be very serious, but fortunately it is of rare occurrence.

A labor forced by solution of posterior pituitary may intensify the minor grades of abnormal cephalic presentation. This may place abnormal strains on the cervix, which in turn dilates unevenly and hence tears more easily and to a wider extent. With this increased portal of entry, would one not expect more minor grades of sepsis?

My opponents respond to these arguments by saying that they admit all of this theory, but they say that they are far too shrewd to be caught in these ways. They just use small doses cautiously, by which they gain a faster labor and no unusual abnormalities.

With these arguments in mind I present a study of 949 cases of administration of this solution during labor by my opponents, in which they tried to be "shrewd enough" by avoiding heavy doses injudiciously given. These cases are taken from St. Vincent's Hospital in Kansas City, which is visited by over 200 busy general practitioners who have maintained a maternal death rate of one in 265 deliveries with a variety of material closely approximating that published by the Chicago Lying-in Hospital over the same period.

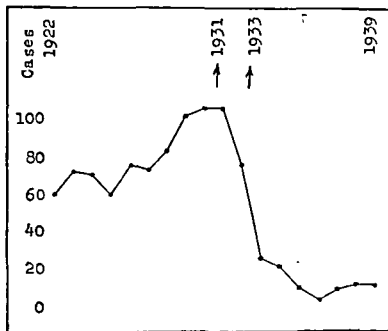


Chart 1.—Total number of cases in which solution of posterior pituitary was used.

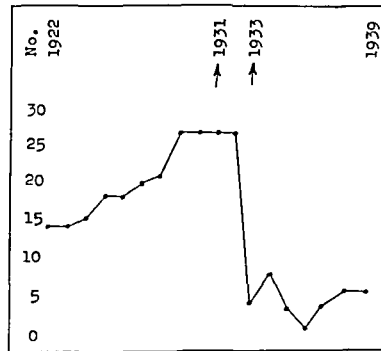


Chart 2.—Number of different physicians using this medicament. Notice how the many dropped to a few within the zone of influence. There must have been a reason for this change.

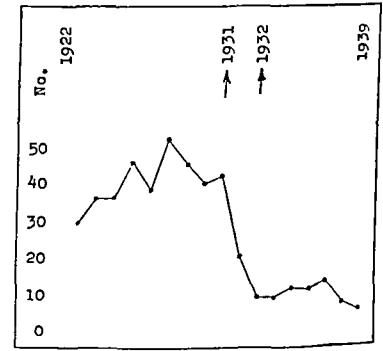


Chart 3.—Total number of dead babies during the years. Notice what a profound drop occurred and remained after the zone of influence.

drug given to patients with the toxemias of pregnancy is insult added to injury. It is contraindicated.

Solution of posterior pituitary intensifies uterine contractions. It increases intra-uterine pressure far above the usual. A careless steamboat engineer screws down his boiler safety valve to get more power and speed out of his ship. He sacrifices safety for speed. When one gives solution of posterior pituitary one increases the uterine boiler pressure far beyond the normal. Safety is sacrificed for speed in labor. When this increased boiler pressure places more stress on the fetus, is this safe for the newborn baby?

With increased intra-uterine pressure come increased uterine muscle contractions. These contractions must disturb the normal passage of food and gases across the uteroplacental barrier. Will the added insult of solution of posterior pituitary be safe for the baby?

Once this drug has been administered the resulting effect comes quickly, and the action cannot be as readily counteracted. After you pull the trigger, you cannot stop the discharge.

This record includes the years from 1922 to 1939. It is a history of physicians in private general practice. I know these physicians, they are shrewd, cautious and conscientious and were quick to catch the point which the following record clearly shows.

During these seventeen years 9,234 women were delivered; 1,713 had some sort of operative delivery, an operative incidence of 18.6 per cent; 949 received solution of posterior pituitary during early labor.

Chart 1 shows the total year by year of cases in which solution of posterior pituitary was used. During 1931 a complete study of the records was started, as designated by the left arrow. Within two years (right arrow) the completed study was presented before the Jackson County Medical Society. The space of time between these two arrows may be called the zone of influence which this study produced.

Something profoundly influenced these cautious physicians to discontinue the use of solution of posterior pituitary, as is shown by the marked drop in its use within the area of influence.

Table 1 shows the record of forceps and podalic versions in all the cases in which solution of posterior pituitary was used compared with the total operative

incidence for the whole hospital clientele. Regardless of the amount of solution each patient received, the various operative procedures show a much higher percentage among patients receiving solution of posterior

TABLE 1.—*Forceps Delivery and Podalic Version*

	Per Cent High Forceps	Per Cent Mid Forceps	Per Cent Low Forceps	Per Cent Podalic Version
Total hospital deliveries.....	1.5	4.4	8.3	1.7
With solution of posterior pituitary.....	4.5	9.7	10.3	4.9
1 to 4 drops.....	3.9	9.5	16.8	3.9
4 to 8 drops.....	3.4	11.5	2.9	12.5
8+ drops.....	4.0	6.4	16.0	1.6
Quinine and/or solution of posterior pituitary.....	5.2	8.8	9.2	1.4

TABLE 2.—*Comparative Data with Different Procedures*

	Per Cent Manual Delivery of Placenta	Per Cent Bag Induction	Per Cent Cesarean Section
Total hospital deliveries.....	0.4	1.2	0.4
Total with solution of posterior pituitary.....	0.7	2.4	5.2
1 to 4 drops.....	0.0		
4 to 8 drops.....	2.4		
8+ drops.....	0.5		
Quinine and/or solution of posterior pituitary.....	0.4		

TABLE 3.—*Complications*

	Per Cent Bandl Ring	Per Cent Hemor- rhage (500 Cc.)	Per Cent Shock	Per Cent Sepsis
Total hospital deliveries.....	0.5	9.3	0.4	7.2
With solution of posterior pituitary.....	6.0	1.8	0.4	7.5
1 to 4 drops.....	0.7	1.4	0.7	5.6
4 to 8 drops.....	1.9	2.9	0.0	9.1
8+ drops.....	2.0	1.6	0.5	6.9
Quinine and/or solution of posterior pituitary.....	1.1	1.1	0.4	8.4

pituitary and/or quinine during early labor. The physicians who use solution of posterior pituitary and/or quinine used obstetric operations much more frequently.

Table 2 sets the total hospital incidence against the cases in which solution of posterior pituitary was employed in regard to manual delivery of the placenta, bag induction and cesarean section. These operative procedures were greatly increased in cases in which the solution was used.

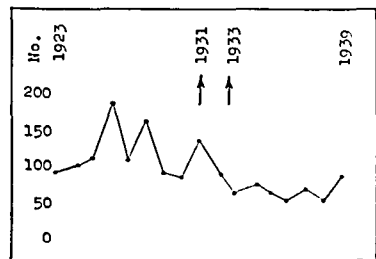


Chart 4.—Operative incidence throughout the years. Notice how this incidence decreases after the zone of influence.

tion did not increase the incidence of shock or sepsis, that of hemorrhages was greatly reduced, while that of Bandl ring contractions was greatly increased.

Table 4 shows the average total first stages extending over a longer period than that observed with the 6,678 women delivered normally and without solution of posterior pituitary. The data show that labor in the

cases in which the drug was used was either slow and urged on by the drug or was delayed by the drug.

Infants in posterior positions, however, were delivered faster than those in similar positions in normal deliveries. The increased uterine power probably hastened dilatation, rotation and expulsion of the fetus.

Table 5 records maternal and fetal deaths. The cases in which solution of posterior pituitary was used are compared with the total hospital incidence. As my opponents argue, they were shrewd enough to prevent maternal deaths, but their fetal deaths were more numerous. This table shows what a deadly baby killer solution of posterior pituitary really can be.

Table 6 is a summary of the action of this drug which I presented to the Jackson County Medical Society in 1932. I believe that the influence of this summary produced a very fine improvement in the care

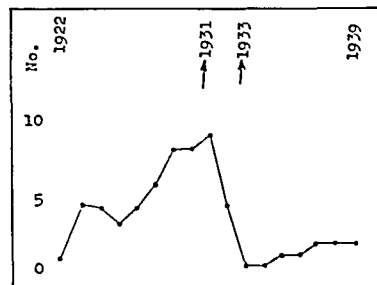


Chart 5.—Total number of dead babies whose mothers received solution of posterior pituitary during their labor. Notice that the drop in deaths occurred during the zone of influence.

TABLE 4.—*Duration of Early Labor*

	First Stage Over Normal	
	Per Cent	Per Cent Posterior Positions
Total hospital deliveries.....	20.0	14.1
With solution of posterior pituitary.....	38.4	10.2
1 to 4 drops.....	35.7	
4 to 8 drops.....	35.5	
8+ drops.....	29.0	
Quinine and/or solution of posterior pituitary.....	21.7	

TABLE 5.—*Maternal and Fetal Deaths*

	Per Cent Maternal Dead	Per Cent Viable Babies Dead	Per Cent Viable Stillborn Babies	Per Cent Viable Babies Dying in Hospital
Total hospital deliveries.....	0.31	2.8	1.05	1.7
With solution of posterior pituitary.....	0.11	6.4	3.1	3.4
1 to 4 drops.....	...	6.9	3.9	3.0
4 to 8 drops.....	...	9.6	4.3	5.3
8+ drops.....	...	9.9	2.9	6.4
Quinine and/or solution of posterior pituitary.....	...	5.7	1.7	3.8

TABLE 6.—*Summary*

Maternal deaths unchanged
Operative deliveries two thirds more numerous but deaths unchanged
Temperatures not markedly increased
Baby death rate doubled at least, with or without quinine; stillbirths 2 to 6 times increased; hospital dead doubled; quinine as bad as solution of posterior pituitary
Labors 1½ to 2 times longer; posterior positions, shorter labor
High forceps and mid forceps deliveries at least doubled and low forceps deliveries increased
Versions doubled or more; manual dilation of cervix increased 10 times, retained placenta 10 times and Bandl's ring 2 times or more
Shock and/or hemorrhage not changed
Quinine as dangerous as solution of posterior pituitary

of obstetric patients in Kansas City, because, while the Kansas City birth rate dropped 1 per thousand in this area of influence, the maternal death rate decreased 4 per thousand live births; the stillbirth rate dropped 23 per cent; the incidence of cerebral hemorrhage

dropped 20 per cent, and that of birth injuries dropped 24 per cent and then began to increase again. During this time these fluctuations were far in excess of those observed in the state of Missouri or the United States in general.

With the exception of minor changes in the sizes of the multiples, the same summary holds true today.

SUMMARY

I have no right to state dogmatically that the use of solution of posterior pituitary during early labor will absolutely cause hidden damage in the pregnant woman or her newborn baby. I feel, however, that the conditions revealed by my study of a long record of cases in Kansas City, with the marked changes which occurred after I called attention to the use of this drug as a dangerous procedure, must by analogy be just as dangerous in any other city or county. I view with great concern the rising tendency in my own city of a venturesome group of physicians again to force labors with the patient under deep analgesia. I think I observe a mild increase in operative incidence, in stillbirths and in babies who die within one week after birth. These physicians have never displayed their wares publicly in statistical fashion, so their results are still problematic. From my own personal contact and study I feel thoroughly justified in repeating my first sentence: that I do not favor the use of solution of posterior pituitary during early labor.

THE USE OF SOLUTION OF POSTERIOR PITUITARY IN MODERN OBSTETRICS

JOSEPH B. DE LEE, M.D.

CHICAGO

Scientists sometimes have an uneasy feeling of doubt whether their epoch making discoveries are really benefiting mankind and try to argue themselves into the conviction that they are improving the social order. Fosdick of the Rockefeller Foundation asks "Can man control the forces he has let loose?"

Carrel says that our stature is not adjusted to the environment which we have created and sometimes what the sciences have given to man has fallen into unsafe hands. Labor saving inventions, he says, have dislocated employment, stunted our mental and physical growth, interfered with improvement of the species which naturally results from the struggle for existence, invited the development of political tyranny, increased the number and magnified the power of death dealing machines, and so on.

Whether or not these charges are borne out in our general social existence, we medical men must admit that sometimes as practitioners, let us say from over-enthusiasm or because we believe propaganda, we have been at fault in our application of the blessings of science—*anesthesia*, *asepsis*, *surgical technic*, *hospitalization* and *medication*.

Among these indictments solution of posterior pituitary has been singled out for this symposium. Rupture of the uterus, laceration of the cervix and dead babies follow in the train of its use all too often, yet it is being used more widely than ever.

Many preparations of solution of posterior pituitary are on the market, and although they are supposed to be standardized in Vögtlin units they vary not a little in strength and, what is equally important, some of them contain an appreciable amount of protein, which may cause anaphylaxis.

Further, combinations of solution of posterior pituitary with hormones and/or drugs—proprietary under fantastic names—have enjoyed worldwide recommendation and use. Manufacturers have been quick to realize the luciousness of a world market with more than 40,000,000 births annually, although many in the far countries are beyond the influence of seductive advertising.

It is claimed that these preparations are safer than straight solution of posterior pituitary, that they have virtues of their own which not only reduce the dangers of the oxytocic but also favorably influence labor; and obstetricians are importuned to administer these questionable drugs to all women for the purpose of hurrying delivery.

No convincing physiologic, experimental or clinical evidence has yet been presented to prove that thymophysin, pituthymin, thytuitary and the like are anything more than diluted solution of posterior pituitary or the drug in another guise (Nelson,¹ Greenhill,² Rucker,³ E. L. King,⁴ Muller and del Campo, Asher's laboratory in Berne).

It is significant that only one of these proprietary has been submitted to the Council on Pharmacy and Chemistry of the American Medical Association and that one was refused approval, its claims not having been substantiated.

Pharmaceutic firms advertise solution of posterior pituitary as an oxytocic for special indications but doctors the world over are using it so indiscriminately and the evils of such practice have become so notorious that it is time for the profession to take stock and see where it is going.

There is an increasing demand among American women for "streamlined labor," an unhealthy demand fostered by hysterical magazine and newspaper writers and, I regret to have to say, by not a small number of physicians. I have observed quite a number of their results, experienced many abnormally rapid labors, and learned that a streamlined labor can be as safe as a streamlined parachute.

What are the dangers resulting from injection of solution of posterior pituitary?

One thinks they all would come from the increase in the violence of the uterine contractions. Most of them do, but solution of posterior pituitary has other evil qualities. It can cause shock which, though seldom fatal, is often ominous and may leave permanent after-effects in the brain. Shock acts like asphyxia. Solution of posterior pituitary upsets the hormone balance in the body. Therefore its use should be avoided in cases of *dysthyroidism* and *diabetes*, *ergonovine* being used instead. In patients with heart disease it may be used only post partum, but here too ergot is better. In cases of threatened eclampsia it is claimed, though I have not

1. Nelson, E. E.: *Thymophysin* Temesváry, J. A. M. A. 96: 352 (Jan. 31) 1931. *Thymophysin Not Acceptable for N. N. R.*, Report of the Council on Pharmacy and Chemistry, *ibid.* 96: 860 (March 14) 1931. *Thymophysin*, editorial, *ibid.* 96: 359 (Jan. 3) 1931.
2. Greenhill, J. P.: *Thymophysin and Weak Pituitary Extract*, J. A. M. A. 98: 1260 (April 9) 1932.
3. Rucker, M. P.: *Action of Thymophysin on Human Pregnant Uterus in Situ*, *Am. J. Obst. & Gynec.* 20: 791 (Dec.) 1930.
4. King, E. L.: Extensive personal communications to the author.

yet seen it, to cause convulsions. Indeed Schockaert⁵ reports postpartum eclampsia without premonitory symptoms with the use of solution of posterior pituitary. Here the pure oxytocic principle of the gland is recommended, and the reasons given are that the whole extract, containing the pressor factor, reduces the flow of urine, raises the blood pressure and also directly causes fits. The latest experiments (Bradbury) cause surprise by showing that the pressor factor affects the uterus and is oxytocic—like the true oxytocic factor—which leaves us about where we were before.

Perhaps we shall learn that solution of posterior pituitary causes other acute dys-hormonisms, which may explain death in labor, the convulsions and anaphylaxis.

Anaphylaxis is not so rare. It shows itself as severe urticaria, violent general or local pruritus, edema of the eyes, face, glottis or lungs, and in some cases as severe shock. A sizable literature is accumulating (McMann⁶ and others).

But the greatest dangers come out of the increase in the intensity and duration of the contractions of the uterus. These may reach a violence that will rupture the organ if the resistance to the advance of the projectile (the baby) is more than the strength of the wall of the exploding chamber (the uterus). How many cases of pituitary ruptures of the uterus occur will never be known. Either they are not reported at all or the women are buried—purposely without postmortem examinations—under another diagnosis. Many women should have the words solution of posterior pituitary put in their death certificates instead of postpartum hemorrhage, embolism, massive collapse of the lungs, anesthesia or shock.

McNeile⁷ in the early days of solution of posterior pituitary had no trouble in collecting sixteen cases of rupture of the uterus. Greenhill gathered twenty-three references from the literature (mostly older) giving thirty-eight cases (two from thymophysin, one from thyuitary); Dugger⁸ has unearthed three cases, possibly five, in Philadelphia, and all the men to whom I have written replied that they know of uterine ruptures from solution of posterior pituitary but cannot prove them, for reasons already stated. This year two ruptures occurred in Chicago hospitals, one from small doses of solution of posterior pituitary, doses usually considered safe.

I have seen pituitary blast the head through the cervix and the perineum, tearing both extensively, and if it happens when I give the drug it will happen when others give it, but I do not have to quote cases of evil results; the action of the oxytocic can be studied with a tokodynamometer, by looking at and feeling the uterus and by watching the effects on the baby. Of course we obstetricians are grateful to the physiologic research worker who has placed a scientific foundation under our clinical experience. Reynolds and Murphy have shown the actions of the uterus under the influence of solution of posterior pituitary, and those who really understand the mechanism of labor will need no admonition regarding the dangerous (for mother and

child) potentialities of the drug. Forces may be set in motion which cannot be controlled.

It has been claimed that combinations of solution of posterior pituitary can be formed which contract the fundus while they relax the lower uterine segment and cervix—but I could not find in this claim an iota of scientific proof. The more rapid dilatation of the cervix is due to the drug strengthening the contractions which force the head, with or without the bag of waters, through the parts, thus canalizing the cervix quicker. One does not have to know much of the mechanism of labor to understand how such violence will destroy the whole internal pelvic architecture which supports the pelvic organs in a manner so admirably adapted to bear the stresses, strains, torques and pressures of the natural functions for which they are intended. Even normal labor puts this well balanced muscular, fascial and connective tissue framework to a severe test. Action of solution of posterior pituitary is ruthless in destroying it and the portals are thrown wide open for the entry of infection. Theory and practice agree, so that statistical proof is not necessary.

I will quote from a letter from a former resident of the Chicago Lying-in Hospital newly located in a large town: "My work is progressing by leaps and bounds. There is a lot of chance for educating people to accept prenatal care and I can spend fifty years repairing the damage done by the injudicious use of pituitary to force stronger labor on the women in the community."

Solution of posterior pituitary can cause such violent labor pains, combined with powerful bearing down efforts, that the sudden overexertion causes cardiac death.

Uteri stimulated by solution of posterior pituitary not seldom suffer secondary atony with clot retention, thrombosis and embolism.

As for the babies, solution of posterior pituitary is of equal if not of greater danger. There is so much ignorance as to the baby's life processes in utero, and particularly during labor, that one is left with little but to theorize, which is especially true of the possible chemical and hormonal changes wrought in its system by the introduction of such a powerful drug. But one does not have to theorize about the physical effects of solution of posterior pituitary on the baby's health and life. Those can be seen during labor and at autopsy.

It is known that during a normal labor pain the baby is exposed to augmented pressure from all sides; its gross blood pressure is raised and also there are in its body local fluctuations of pressure which, as the cervix opens, are progressively greater in the direction of the vagina. This is because the resistance at the uterine outlet is diminished, and it is thus that the child is propelled into the external world. The baby's head naturally receives the brunt of the fluctuations in pressure, as is so plainly evident from the caput succedaneum and the minute hemorrhages in the scalp, the periosteum and often in the subjacent dura and brain. The physics of the process can be seen and understood every time one squeezes a tube of tooth paste.

The molding of the head is another result of the mechanical forces of the uterus, and its safety for the fetus is only partly guaranteed by the slowness of its execution. Every strongly molded fetal head should be scrutinized at postmortem examination. One will be astonished at the dislocation and deformation of the

5. Schockaert, J. A.: *La pituitrine ne doit-elle pas céder le pas en obstétrique devant l'ocytocine?* Bruxelles-méd. 16: 683 (March 1) 1936.

6. McMann, Walter: Pituitary Shock, *Am. J. Obst. & Gynec.* 31: 1047 (June) 1936 (one case); Hypersensitivity to Solution of Posterior Pituitary, *J. A. M. A.* 113: 1488 (Oct. 14) 1939.

7. McNeile, L. G.: Rupture of Uterus Following Pituitary Extract, *Am. J. Obst. & Gynec.* 74: 452 (Sept.) 1916 (collected sixteen ruptures and thirteen deaths from solution of posterior pituitary).

8. Dugger, J. H.: Review of Deaths from Rupture of the Uterus, Philadelphia, 1931 to 1938, to be published.

bones, the distortion of the brain, the overstretched falx and tentorium, with even tiny dehiscences in them, and the minute and larger saggulations. Indeed, ruptures of the falx and/or tentorium are not so rare even in normal labor, and there is no doubt that these membranes occasionally tear and the child apparently recovers without threatening symptoms, i. e., while in the hospital.

As long as the bag of waters is intact the pressure exerted by the contracting uterus, which is known to be exerted equally in all directions, is counteracted by the resistance of the container walls, and the pressure in the baby's head is only slightly increased. As soon as the membranes rupture, a pressure flow in the direction of the head and of the cervix begins with each pain and grows greater as the cervix opens and the contractions wax stronger. It is these fluctuations of pressure which endanger the brain. With each contraction blood and lymph are driven into the brain, congesting the capillaries, weakening their walls and inviting edema. During the diastole of the uterus the blood and lymph ebb, but not completely. This is because of the increasing tonus of the uterus and the girdle of resistance. Each pain repeats the process with effects growing as the contractions become stronger until the gross picture described under molding is produced. Microscopically the cerebral changes are capillary dilatation and edema, blood points, diapedesis of leukocytes, serosanguineous exudation, edematous brain cells and, in bad cases destruction of these. The pathologic changes are like those of asphyxia. Indeed solution of posterior pituitary, by making long violent tetany of the uterus, causes asphyxia with slowing of the fetal heart, through stoppage of the uteroplacental circulation. When the membranes are broken the slowing of the fetal heart is in the carotid sinus mechanism—a heart block; the blood cannot get through the placenta. Confirmatory experimental evidence is brought by Woodbury, Hamilton and Torpin.

The "hypodermic manometer" was developed by them at the University of Georgia School of Medicine:

It has enabled us to measure the effective maternal blood pressure which supplies maternal blood to the placenta. We have recorded this effective pressure as well as the uterine pressure when pituitary preparations were given to three multiparous patients. Luckily no fatalities have occurred in these experimental studies.

Our results show that (1) intra-uterine asphyxia and (2) uterine tetany are real dangers associated with the use of pituitary preparations in the second stage of labor. In all three cases it reduced markedly the effective blood pressure to the placenta and produced incomplete uterine tetany which lasted from seven to twelve minutes. In one case intra-uterine asphyxia of the baby nearly occurred. The effective maternal placental blood pressure in this case averaged 85/50 mm. Hg between pains and 65/15 during pains. Pituitary extract reduced this to an average of 30/—10 mm. Hg for ten minutes and it stayed low throughout the remainder of labor. At one time this effective pressure was reduced to 5/—25 mm. Hg (5 systolic and 25 mm. Hg below zero diastolic pressure). This meant that the uterus was so contracted that maternal arterial blood not only could not enter the placenta, but that the uterus was actually squeezing blood from the placenta into the mother's aorta as well as into the veins. The maternal blood supply to the placenta was stopped. The baby's heart sounds became slow and faint and at one time we were not sure that we could hear them. Fortunately the uterine tetany subsided somewhat, the effective placental pressure gradually increased to nearly normal and the child's heart sounds became louder and regular.

What chemical changes go on in the brain, in the endocrine glands and in the fetal body are not known, but there is enough other information to make one realize that the brain is a very tender organ, that it bears the insults of the forces of labor poorly, and therefore that one should not augment the intensity of these forces without very good reason.

On the contrary, understanding and fearing their power one should rather reduce the forces to the minimum required for the delivery of the child.

In this connection a recommendation by Dr. Rawlins⁹ of London 150 years ago is of interest. He forbade bearing down in the second stage of labor, insisting that the baby be born by the uterine action alone. He claimed that there were less perineal lacerations and fewer dead babies with this practice. A modern delivery room without "Bear down! Bear down!! Bear down!!!" would be quite a curiosity.

The harmful action of solution of posterior pituitary in normal labor is thus clear. Solution of posterior pituitary (1) strengthens the uterine power and prolongs its action, (2) shortens the diastolic rest periods and (3) increases the intra-uterine tension by raising the tonus of the muscle—in short, solution of posterior pituitary makes normal pains pathologic and exaggerates all their evil effects on both mother and baby.

A totally neglected aspect of the use of solution of posterior pituitary to hurry normal labor is the medico-legal one, but it was brought to my attention recently in a poignant manner: A father brought his spastic and idiotic 6 year old son to me, asking me to appear as expert witness in an action he proposed to bring against his doctor. The doctor had given solution of posterior pituitary to start and then to expedite labor so that he could go on his vacation. The labor was tumultuous, painful and spontaneous and the child suffered a cerebral hemorrhage, diagnosed by four of the city's leading pediatricians and neurologists as birth injury. I had much trouble in saving the doctor from a lawsuit.

Inquiry of the Bureau of Legal Medicine and Legislation of the American Medical Association brought this reply from Dr. W. C. Woodward, condensed from a long exhaustive opinion:

As far as civil liability is concerned, the question would have to be decided by the testimony of experts in the community testifying as to whether such practice in the individual case represented "due diligence, ordinary knowledge and skill and best judgment":

"To the foregoing may be added the statement that no professional standard anywhere or at any time could justify a physician in doing anything that would jeopardize the life and well being of mother or infant solely for the physician's convenience. Moreover, consent by the father or mother, even with a thorough understanding of the matter, would not excuse a physician who deliberately induces and expedites labor solely for his own convenience, to the material danger of the mother and child." Further, it would be necessary to prove cause and effect.

The use of solution of posterior pituitary or other agency to induce labor may or may not come into the field of criminal practice, depending on the laws of the states. Herzog says that the legal term abortion or miscarriage applies from the day of conception "to the

9. Rawlins, R. A.: A Dissertation on the Structure of Obstetric Forceps, London, B. & J. White, 1793.

time when a full term labor commences." Many states insist that induced abortion is punishable by imprisonment for from one to ten years and that if the mother dies from the operation the person procuring or causing the abortion or miscarriage shall be guilty of murder.

Again Dr. Woodward stated:

If then, as seems to be indicated by the definitions set forth above, an abortion covers all premature deliveries of ovum, embryo and fetus up to the termination of natural gestation, it may be questioned whether a physician can lawfully do anything to expedite the onset of labor, unless it is necessary to do so for the life—and in some states possibly for the health—of mother or baby. If the induction of premature labor for purposes of mere convenience is unlawful, the consent of the mother and of her husband would not protect the offending physician from criminal prosecution. How far such consent would go toward relieving the offending physician of civil liability or of mitigating damages is another question, involving the rather difficult problem of the extent to which a child, injured in the process of birth, may have a right of action against the physician who is responsible for the injury, notwithstanding anything that the parents may have authorized to be done in the conduct of labor.

However, solution of posterior pituitary is one of the great blessings that science has conferred on women, and the profession is now well agreed on its scientific indications.

SCIENTIFIC INDICATIONS

During Pregnancy.—Hofbauer¹⁰ and I simultaneously discovered that solution of posterior pituitary could cause the relaxed ureter to expel its contents and thus aid in the cure of pyelitis. I have used it only after delivery but Hofbauer claims that it is safe during early pregnancy because the uterus has not yet become sensitized.

In case of abortion in progress, after an appendix operation, solution of posterior pituitary may be exhibited for the double purpose of emptying the uterus and overcoming ileus.

In septic abortion after a preliminary course of quinine, 3 grains (0.2 Gm.) each hour for five doses, 5 Vögtlin units is given hourly until the ampule is used up. Solution of posterior pituitary is also usable in all abortions actually in progress to hasten the process and save blood. Further, when curettage is done for incomplete abortion one half ampule, injected deep into the cervical wall, will stiffen the uterus, separate the secundines and give the curet a harder and safer surface to work on; it will also reduce the loss of blood. The blood should always be saved.

Labor.—It is safe to induce labor with solution of posterior pituitary but only if proper precautions are observed. It is never to be used in cases of placenta praevia. I found that Hofbauer's nasal method was dangerous, and I learned too that some women react to even small doses of the oxytocic with too strong pains no matter how it is given. (Reynolds showed this in his tracings.) I have seen 3 minims (0.2 cc.), or 2 Vögtlin units, put both mother and baby in peril. Therefore to induce labor I give one half unit with a tuberculin syringe and, with ether can in hand, watch the effect. At the end of twenty minutes 1 unit is given, and thereafter a like dose every twenty to thirty minutes until some effect is seen. Then I wait a while and if the force of the contractions dies off I repeat the dosage

or increase it a little, not using more than one ampule. 10 Vögtlin units, in one trial. I have discontinued the use of quinine to sensitize the uterus because it is inefficient and occasionally harmful. The morning of the induction, the patient is given castor oil. In cases of high blood pressure some recommend pitocin, which is supposed to have the blood pressure raising element of solution of posterior pituitary removed. In my own experience, this has not been the case and now, since Gardiner and Bradbury¹¹ have shown that pitressin, which was thought to be free from oxytocic action, has as much as pitocin, the possible pressor action of pitocin is to be considered.

During Labor Itself: As has been sufficiently emphasized and proved, there is no justification for the use of any oxytocic in normal labor. Expediency and convenience of the doctor or patient are not scientific indications and, outside of running the risk of being legally held responsible in the event of accidents, the medical conscience forbids such use. No one has demonstrated any prophylactic virtues for solution of posterior pituitary for either the mother or the baby in normal labor.

In cases of atonia uteri, pure primary uterine inertia in the absence of a contracted pelvis, fibroids or mechanical organic obstruction, I make a brief trial of solution of posterior pituitary, watching and feeling my way carefully, like handling dynamite. These precautions are especially necessary after the membranes have ruptured.

For atony during the second stage of labor, even greater caution is necessary, although it is here that the practitioner often uses the least. I feel sure that the forceps operation with episiotomy is safer to terminate labor, after complete dilatation, with the head on the perineum, than giving a woman a shot in the arm to blast the baby out of her person. Every man who practices obstetrics ought to know how to do an episiotomy and the prophylactic forceps operation. The baby's brain will suffer less damage and the mother's pelvic organ supports will likewise be safer.

In cases of abruptio placentae it is permissible to give solution of posterior pituitary—again with precautions—to hurry labor and increase uterine tonus, but never in placenta praevia until the baby is delivered.

The Third Stage of Labor.—Should solution of posterior pituitary be used as a routine in the third stage of labor? Such practice is widespread but the reports of the results are conflicting (Williams,¹² Percival,¹³ Clayton,¹⁴ Fortin¹⁵ [2,200 cases]). Some state that it shortens the third stage, reduces loss of blood, favors the expulsion of the placenta, prevents postpartum hemorrhage and favors involution, which minimizes the risks of infection. Others deny these actions. In my experience solution of posterior pituitary does reduce the duration of placental delivery and the loss of blood but not much, and further I have had not a few pla-

11. Gardiner, Sprague, and Bradbury, J. T.: Responses of Human Post-Partum Uterus to Posterior Pituitary Extracts, *Am. J. Obst. & Gynec.* 39:1 (Jan.) 1940.

12. Williams, B. L.: The Effects of Injection of Pituitary Extract Immediately After Delivery, *Proc. Roy. Soc. Med.* 32:920 (June) 1939.

13. Percival, R. C.: On the Effects of Pituitary Extract (Posterior Lobe) in the Third Stage of Labor, *Proc. Roy. Soc. Med.* 32:923 (June) 1939.

14. Clayton, S. G.: The Effects of Injections of Pituitary Extract Immediately After Delivery, *Proc. Roy. Soc. Med.* 32:926 (June) 1939.

15. Fortin, F. F.: Comparative Study of Posterior Pituitary Extract Administered at Onset of and After Completion of Third Stage of Labor, *Am. J. Obst. & Gynec.* 35:761 (May) 1938. Additional references will be found in the reprints.

10. Hofbauer, J. I.: The Intravenous Administration of Postpituitary Extract for Obstetric Purposes, *Am. J. Obst. & Gynec.* 36:522 (Sept.) 1938.

central incarcerations which wiped out much of the pleasure of the other two advantages.

Some, as soon as the shoulders have passed the vulva, give an ampule of solution of posterior pituitary intramuscularly; others at the same time give 2 units intravenously; some wait till the feet have left the introitus and then inject the drug; others insist that the placenta must be out before any oxytocic is allowable.

For many years, in all operative deliveries under a general anesthetic, we gave an ampule of solution of posterior pituitary immediately after the child was born and we recommended the procedure. In spontaneous deliveries in which the uterus acted well, we did not use the drug as a routine but gave it when the patient had had much obstetric analgesia and/or anesthesia. With local anesthesia it was not needed.

At present at the Chicago Lying-in Hospital we are experimenting with ergonovine intravenously, injected as a routine when both shoulders have appeared, and we find that it is not to be recommended for general practice. It is useful, like solution of posterior pituitary, after operative delivery and when atonia uteri is feared.

For postpartum hemorrhage solution of posterior pituitary is invaluable, though it fails occasionally. Of course it will not stop bleeding from a laceration or from a ruptured uterus (which incidentally it may have caused) but it will almost always cause a uterus to contract powerfully, especially if administered intravenously or injected directly into the uterine muscle. I always use ergonovine to back up the action of solution of posterior pituitary. Sometimes it is better than solution of posterior pituitary, particularly if put into a vein.

In the Puerperium.—Solution of posterior pituitary has yielded place to ergonovine in nearly all cases in which an oxytocic is needed during the puerperium. I can imagine that it might be used to expel a piece of placenta or a clot that remains in the uterus, or in late hemorrhages of a hormone nature, together with ergonovine.

SUMMARY

1. Proprietarys such as thymophysin, thyuitary, pituthymin and combinations with quinine are not to be recommended. They are diluted solution of posterior pituitary or are the drug disguised.

2. Even natural labor can cause damage and/or death to both mother and baby.

3. Solution of posterior pituitary augments the forces of labor which inflict such damage and/or death—lacerations of the cervix, vagina, perineum, even rupture of the uterus, and cerebral damage in the babies.

4. Solution of posterior pituitary may cause severe shock and anaphylaxis and may explain certain fatalities in dyshormonisms and circulatory and renal diseases.

5. The medicolegal aspects of administering a potent and dangerous drug, as a matter of convenience, are worth consideration.

6. Proper indications for solution of posterior pituitary are numerous: in pregnancy to induce labor, in labor, and post partum. These indications are well defined and defensible.

CONCLUSION

Solution of posterior pituitary is one of the great boons that science has conferred on women, but it should not be used without a clear, generally accredited, scientific indication. It is now being supplanted by ergonovine in many places.

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ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. SHARKEY, PENDLETON AND DELEE

DR. RICHARD TORPIN, Augusta, Ga.: The papers presented have forcefully described the abuses and misuses of solution of posterior pituitary. We are convinced from studies at the University of Georgia (see Woodbury, Hamilton and Torpin) that it may be hazardous to use solution of posterior pituitary prior to delivery of any patient in labor irrespective of the strength of the pain. We found that 1 minim (0.06 cc.) of solution of posterior pituitary administered intravenously caused a marked increase in the strength of uterine contractions, more frequent contractions and even tetany, and reduction of maternal blood flow to the placenta over a pathologic period of time. Solution of posterior pituitary increased the uterine contraction pressure from values of 25 to 45 mm. of mercury to values of 80 or 90 mm. Patients who had weak pains have the larger increases and are, as far as we know, just as likely to have uterine rupture as any patient. In all cases solution of posterior pituitary placed abnormal stresses on the uterus. Concerning the character of the contractions, the normal rest period between pain is reduced or abolished. Incomplete tetanus was always observed and in one of the five patients complete tetanus was present for six minutes. Normal contractions did not recur until ten minutes after administration of 1 minim of solution of posterior pituitary. With these more or less continuous pains the patient bears down and the abdominal muscles are used to hasten delivery, additionally increasing the pressure and possibly causing further damage to the baby and to the birth passages. Concerning the reduced maternal blood flow to the placenta, much reduction occurs during a normal labor contraction but it is of so short duration that it produces no significant fetal anoxemia. Solution of posterior pituitary, however, not only increases this pressure but prolongs the period of elevated intra-uterine pressure, resulting in fetal anoxia of pathologic duration. In one case the intra-uterine pressure was so great that the uterus at times was actually squeezing maternal blood back into the aorta as well as into the veins. The pressure remained high so long that the maternal blood supply to the placenta was markedly curtailed over ten minutes. The baby's heart sounds became slow and faint and finally could no longer be heard. Fortunately the uterine tetany subsided so that the placenta circulation gradually increased and the fetal heart sounds again became audible. We have in our records graphic proof of the factors which may account for the dangers of solution of posterior pituitary: uterine rupture, injury to birth passages and fetal anoxemia, with attendant injury to the nerve cells or blood vessels within the brain.

DR. ALBERT B. DAVIS, Camden, N. J.: With the Philadelphia Committee on Maternal Welfare Dr. Sharkey condemns solution of posterior pituitary for the death of twelve infants in 1,000 stillbirths and as the cause of four out of ninety cases of ruptured uterus. He points out its dangers to mother and child. In all of Dr. Sharkey's conclusions I can agree. There is no doubt of the contraindications to, and the dangers in, its use in normal and in obstructed labor. The question is When, if ever, can solution of posterior pituitary be used to definite advantage in the first or second stage of labor? This indication limits its use to a comparatively small number of cases of primary inertia. Even these cases, in my own experience, have been more frequently treated by sedation and supportive measures until dilatation, and then instrumental help. Dr. Sharkey apparently found solution of posterior pituitary indicated in only eighteen such out of more than 10,000 cases in his hospital services, an incidence of one in 570. Yet these are the cases in which the judicious use of solution of pituitary may be helpful. In all forms of inertia the contractions are weak, but the tone may vary, being normal or normotensive, low or hypotensive or high or hypertensive. I have made some tracings which are schematic. In normal labor the uterine contractions are more or less regular and of what is called normal strength. In inertia the tension may be about the same, or may be low or may be high, but the waves are always small. The arrows in the center indicate the giving of a small dose of solution of posterior pituitary.

In normal labor the contractions are increased intensely. In normotensive inertia the contractions are increased and the tone somewhat. In hypotensive inertia both contractions and tone are increased. But in hypertensive inertia the contractions are practically destroyed by the increase in tone. There is already a high tension of the uterus, and solution of pituitary given in that condition does harm instead of good. The normotensive and hypotensive inertias are helped by solution of posterior pituitary, which always means properly given in small initial doses, but in the hypertensive cases it is not only useless but dangerous. In any case the dose should begin with 1 to 1½ minims and not exceed 3 minims at thirty-minute intervals. If we cannot differentiate our cases, we should probably do better not to use solution of posterior pituitary at all in the first or second stage of labor.

DR. JAMES K. QUIGLEY, Rochester, N. Y.: In 1915 I wrote a paper on solution of posterior pituitary in obstetrics which was published in *THE JOURNAL*. This was only a few years after Blair Bell's pioneer paper. The enthusiasm which greeted the advent of this new agent is reflected in the opening paragraph of my paper, "Throw away your forceps and use pituitrin" is the glowing headline of a recent advertisement of a large pharmaceutical concern." This report was based on the use of solution of posterior pituitary for inertia in the second stage of labor. The early popularity has given way to a conservative attitude, for soon cases of uterine rupture following the use of this powerful oxytocic appeared in the literature. I was surprised that solution of posterior pituitary during labor would be the subject for discussion on this program, for I have not seen the drug used during the first or second stage of labor for at least ten years. The indications laid down by me in 1915, considering the popularity of solution of posterior pituitary, expressed a guarded attitude. They were a fully dilated cervix, a normal presentation and position, an engaged head, the absence of disproportion and the presence of inertia. In addition to these indications the following injunction was made: "Pituitary extract must be used judiciously and with a due appreciation of the possible dangers of so powerful a uterine stimulant. This is the most important point." Today I believe that outlet forceps is safer than the employment of a powerful oxytocic with susceptibility of the uterine muscle an unknown factor. This would seem like a retraction. It is. We live and learn, and we are inclined to become more conservative. Dr. Pendleton has shown conclusively the dangers of solution of posterior pituitary to both mother and child. He has also shown a lower fetal mortality and lower maternal morbidity following its abandonment, and, granted that the incidence of serious complications such as fetal asphyxia, contraction ring dystocia or ruptured uterus were only one in 100 cases of its use, that is too high a price to pay when other measures may be employed with greater safety. The safe rule is no solution of posterior pituitary during the first and second stages of labor.

DR. E. D. PLASS, Iowa City: I appreciate this opportunity to discuss Dr. DeLee's communication. I am in almost complete agreement with his observations and conclusions. We have occasionally differed widely, but now we find a common ground in condemning the indiscriminate use of solution of posterior pituitary. It is a valuable therapeutic agent if employed properly but is dangerous when used during the first and second stages of labor. Solution of posterior pituitary is especially misused by the general practitioner and more commonly during home deliveries, when facilities for treating the ensuing difficulties are largely nonexistent. An analysis of the records of 1,000 home deliveries by general practitioners in Iowa reveals that solution of posterior pituitary was used "to strengthen labor pains" in 325 cases, or 32.5 per cent. In 90 per cent of the cases, "pituitrin" was employed and the dose varied from 1 minim to 1 cc., while in the remaining patients one of the thymus-pituitary atrocities was used. The admitted stillbirth and neonatal death rate in this group was 2.8 per cent as against 2.5 per cent among the 675 patients who were not subjected to such therapy. It is doubtful whether this small difference is signifi-

cant. The single maternal death in the series was of a patient who had been given solution of posterior pituitary but who allegedly died from pneumonia on the second day after delivery. From the philosophic angle the argument against the use of solution of posterior pituitary during labor is difficult to answer. It is a well accepted principle that treatment should be directed at the relief of some condition existing in the patient; even placebos have this virtue. The employment of solution of posterior pituitary during labor contravenes this principle, since there is no evidence that a rapid, pituitary stimulated delivery is better for the mother or the baby; in fact, the weight of experience strongly supports the idea that a slower, more natural parturition is better and safer. Obviously, then, the effect of the medication serves only the convenience of the physician, and it can be expected to do him no harm irrespective of the dose or the circumstance. Those who have employed it critically since it was introduced twenty-five years ago will generally subscribe to the restrictions Dr. De Lee places on its use. It has no place in the conduct of the first stage of labor except in rare and carefully selected cases, and in the second stage forceps is safer and better. I have seen perhaps half a dozen patients with uteri ruptured by the action of solution of posterior pituitary and have had histories, from patients and physicians, of some dozens of babies who have died following and probably because of, administration of the preparation. Even in the induction of labor it is not completely safe.

DR. E. L. KING, New Orleans: I might paraphrase Mark Anthony's remark. It seems we have come here to bury pituitary, not to praise it. That is proper in the majority of instances. The argument appears to be strong that in labor there is practically no indication for solution of posterior pituitary. We may say that in primary inertia it would appear occasionally that it might be necessary to use some uterine stimulant. In the vast majority of instances that can be avoided simply by taking time. A woman with slow, irregular pains for two or three days can be supported and can be strengthened and can be rested. The difficulty in such a case comes particularly with the practitioner and more especially with the rural practitioner. We have to bear him in mind, and that is especially true in the South, where he has a large territory to cover and where his time is limited. Under such circumstances we may admit that a very small dose of solution of posterior pituitary, carefully watched, might be prescribed. I feel that one should never use more than from one half to 1 minim and that it should not be repeated if there is any untoward result. The effects on the uterus and on the fetus should be watched very carefully. Unfortunately, some manufacturers are advocating thymus combinations with the explanation that they are perfectly safe. I do not think that we can say they are; the pituitary content is there and I do not feel that the thymus extract modifies the pituitary action to any extent. The moral is preferably not to use pituitary at all in the first and second stages of labor. In the New Orleans Charity Hospital we deliver over 4,000 women a year, and the pituitary cases a year can be counted on the fingers of the hand. We have more worry and discussion over whether we should use pituitary than we have over whether we should or should not perform a cesarean section. We have an ironclad rule that pituitary is not to be used except when specifically ordered by a senior member of the house staff or a member of the visiting staff, before the third stage of labor. We feel that such teaching is better than any other form of teaching and that the health of the mother and the health of the baby will be better safeguarded by refraining from its use except under very definite indications.

DR. DOUGLAS P. MURPHY, Philadelphia: Dr. Sharkey condemns the use of solution of posterior pituitary for the purpose of shortening normal labor. He advocates its employment in the treatment of primary inertia but insists on small dosage. I agree with him. The danger which results from the improper use of solution of posterior pituitary is more a problem of dosage than a question of which patient should receive it, and for that reason I think that those who oppose its use have missed the point entirely. They have condemned the use of the

drug when in practically every case I am quite certain that doses were used far in excess of what should have been employed. I have recorded in more than 100 cases, with the Lorand toco-graph, the character of the uterine movements initiated by the hypodermic administration of solution of posterior pituitary at term and during labor. These observations show that optimal doses either initiate or reinforce rhythmic uterine contractions, whereas overdosage almost invariably induces tetanic spasm. The latter may last for many minutes before good quality rhythmic contractions begin. At our hospital recently a patient was ordered 1 minim (0.06 cc.) of pitocin; by mistake she received 1 cc. She experienced a uterine spasm which lasted thirty-three minutes. We have found that, if tetanic spasm is to be avoided, the optimal dose is in the neighborhood of 1 minim. Such a dose is effective for about thirty minutes and can be repeated safely at that interval as often as indicated by the condition of the patient. For accuracy in dosage we have found most suitable a 0.25 cc. syringe. With this, one is not so likely to give an overdose as when employing the usual 1 cc. tuberculin syringe or the 2 cc. syringe. Solution of posterior pituitary has a place in the treatment of certain patients in labor, but only when a nontetantizing dose is employed, and that dose is in the neighborhood of 1 or 2 minims. I take issue with the gentlemen who condemn the use of solution of posterior pituitary because I am certain that they are condemning it where patients have received excessive doses of the extract and not optimal ones. We rarely see a tetanic spasm following a dose of 1 minim or less of solution of posterior pituitary or pitocin. I do not think that solution of posterior pituitary should be condemned but that the dose should be in the neighborhood of 1 or 2 minims. If a good result follows 1 minim, the result will be no better with 2 minims. In fact, an excellent result may follow with one half minim.

DR. J. I. HOFBAUER, Cincinnati: If we listen to the arguments against solution of posterior pituitary it seems that I owe you an apology for having introduced into obstetrics its use during labor. If you will look up my paper published in the September 1938 issue of the *American Journal of Obstetrics and Gynecology* you will find the indications and contraindications which have been stressed by Dr. De Lee pretty similar to my views. The introduction of solution of posterior pituitary more than twenty-five years ago, as a means of initiating and reinforcing labor pains, constitutes a landmark in the development of the science and art of obstetrics.

DR. RUDOLPH W. HOLMES, University, Va.: Through my contacts with the personnel of a large pharmaceutical house I was given a supply of solution of posterior pituitary before the product was publicized and I used it in numbers of cases. Years later, when visiting the plant, I was shown a narrow test tube about a third full with a reddish black crystalline substance. The statement was made that, as far as their chemists were able to determine, the contents of the tube were the ultimate active secretory substance of the postpituitary gland; as there never has been a public avowal thereon we may be certain that there never was a conclusive verification of the opinion. The startling thing is that it was stated that one millionth of a grain of that crystalline substance had a potency equivalent to 10 cc. of the extract. I cite this matter to accentuate the direful consequence which may ensue if this powerful drug is administered to a parturient woman who is peculiarly susceptible to the effects of the medication. In the early days when full doses were indiscriminately given to stimulate contractions I collected some thirteen reports of ruptured uteri with death in about eighteen months in the city of Chicago. I was invited to discuss the use and abuse of postpituitary extracts before a county medical society in an adjacent state: I fervidly stressed the risks which might result from massive dosages. Some weeks later the secretary wrote me that one of my auditors had been called to a woman early in labor; in some four to six recurrent visits he gave her an ampule of this powerful drug. At his last visit he found a woman dead from a ruptured uterus. The postpituitary products are among the greatest gifts to the welfare of the

obstetric women, but the abuse of the administration makes it a menace in the hands of the unwary. It should be given with extreme circumspection, and always in minimal doses—before the birth of the child. I believe that nasal administration is the safest method of administration: absorption is slow; with the first sign of undue response to the drug the nasal pack may be removed: when given parenterally the dosage is beyond recall.

DR. SAMUEL R. M. REYNOLDS, Brooklyn: I knew that Dr. Torpin was going to be good enough to present the work of his clinic, which shows that during a large portion of the contraction of the uterus in labor intra-uterine pressure exceeds the effective arterial pressure in the maternal placenta. That means that there is no flow of blood through the maternal vessels of the uterus during this part of the normal labor contraction. For this reason it is worse to induce a spasm in which this effect is sustained for a time. I might point out that mechanisms exist which protect the baby for the intermittent contraction but not for the spasm type of contraction. The difference in chemical composition between the maternal blood and fetal blood is such that toward the end of pregnancy there is a high degree of unsaturation of the maternal blood; the venous blood from the uterus (in rabbits) comes back from the uterus with about 25 per cent oxygen saturation, whereas earlier in pregnancy it may be as much as from 60 to 80 per cent. The fetal blood, on the other hand, through buffering systems, and differences in hemoglobin type, is able to take up from maternal blood, held in the placenta, an increasing amount of oxygen. Obviously this can take place for only a short time.

DR. GEORGE F. PENDLETON, Kansas City, Mo.: This discussion seems to come down more or less to and center around inertia. I will admit there is such a thing as uterine inertia, but when a woman goes into labor and then labor pains stop, that is not inertia. There is something that causes that, and you had better give that woman some food and rest and she will come along.

DR. JOSEPH B. DE LEE, Chicago: It seems that most of those who have discussed these papers have missed the point. I hardly think any one of our authors doubts that there is good use for solution of posterior pituitary. I know that I have emphasized that clearly, but the point that I wanted to bring out was that there is no use for solution of posterior pituitary in normal labor. Now why should you want to hurry a normal labor? The woman certainly has plenty of time, and if she takes nine months producing a baby I don't think she could spend her time in any better way than in devoting a few hours to delivering it. From the woman's point of view there is no hurry. Nobody has ever proved that solution of posterior pituitary has any prophylactic values. Dr. King mentioned that the country doctor with little time wants to get the baby out and go home. But there should be no hurry. Let that country doctor go away and come back, even though it is some distance, timing his visits, and if he finds the baby in bed it probably won't hurt very much. I wanted in my paper to make a plea for the safety of the cervix, the pelvic floor and the supports of the uterus. And I wanted to make a plea for the baby's life, immediately, and for the integrity of its brain in the future.

No Efforts Too Great.—As the science of medicine has developed, it has come more and more to dominate the practice of medicine, to standardize procedures, to improve the diagnosis of disease, to rationalize its treatment, and to demonstrate methods of preventing disease. In the cultivation of science, leaders of medicine have concentrated their thought and effort on the biological, chemical, and physical sciences as applied to the study of human life, striving to understand more deeply the laws and principles by which it is preserved and the ways and means by which it is disturbed. The rapid progress of medical science has brought untold benefits to the human race and as a mark of human progress the history of medicine during the last century stands supreme. No efforts are too great to maintain and accelerate its growth.—Robinson, G. Canby: *The Patient as a Person*, New York, Commonwealth Fund, 1939.

TOBACCO AND CORONARY DISEASE

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During recent years the medical profession has displayed increasing interest in the problem of tobacco smoking and its influence on persons who are in good health as well as on patients afflicted with disease.¹ Numerous laboratory studies have been conducted in which the effects of tobacco smoke on normal animals have been investigated.² These investigations have been important but have cast little light on the problem as it affects human beings owing to the fact that great differences exist between conditions of normal animals ordinarily unexposed to tobacco smoke and the varying states of human beings, who as a species have been exposed to this agent for many generations.

Pearl's study of human longevity in relationship to the smoking of tobacco has been an important contribution to the subject.³ His study indicated that the expectation of life of nonsmokers exceeded that of smokers and that among smokers average longevity decreased progressively with increasing degree of smoking. Several clinical studies that have dealt with the effects of smoking on coronary disease have been published but the conclusions drawn have been comparatively indefinite.⁴

In undertaking this study we were clearly aware of the fact that we were pursuing only one of the many considerations that enter into the problem of coronary disease. In fact, we presumed that in all probability the smoking of tobacco was not an etiologic factor but was perhaps an influence that affected the course and the progress of the disease. In an investigation dealing with the effect of a chemical agent in a large number of individuals one must be aware of the wide range of reactions that undoubtedly exists and which may greatly influence the conclusions of any study, experimental, clinical or statistical. We have carefully considered various approaches to the problem and have concluded that at the present time the most satisfactory method of study available to us would be a statistical survey of a representative series with proper controls. The more

thorough method of actually conducting clinical experiments on a selected group of individuals would require many years to complete even if it was practicable.

MATERIAL

This study was initiated by selecting from our files 1,000 records of representative cases of well established coronary disease. They comprised cases of recurrent angina pectoris, healed cardiac infarction and recent and acute cardiac infarction. It soon became apparent that certain modifications in this sampling were desirable for statistical reasons, owing to the extremely small number of females and the small number of both sexes less than 40 years of age which are to be found in a random series of 1,000 patients with coronary disease. It was therefore determined to include only males 40 years of age or older and the cases were grouped for the following age periods: 40 to 49 years, 50 to 59 years and 60 years and more. The requisite number of males to complete a total series of 1,000 cases was then secured from our records, selected only on the basis of age and cardiac status, so that they should accord in other respects with our basic requirements of randomness of selection. Then for each case it was noted whether the individual was or was not a smoker and, if a smoker, the degree of smoking was graded (on the basis of 1 to 4, in which 1 indicated least and 4 most smoking) as accurately as possible. The great majority of individuals in this study who were smokers used cigarettes, whereas only a small fraction of cigar smokers and pipe smokers was present.

Then we secured for a control group of individuals without coronary disease the histories of 1,000 males taken consecutively from our files for the same years as the series of cases of coronary disease. Only age and sex and the nonexistence of coronary disease were consulted in this selection; no attention was paid to the individual's status as a smoker. This, in fact, was not obtained from the record until later. The individuals taken as controls comprised patients whose examinations were recorded as revealing normal conditions or abnormalities entirely unrelated to the cardiovascular system. Here, as for the group with coronary disease, data regarding smoking and its degree were recorded.

The results of the analysis of these two groups are found in table 1. Among the group of patients with coronary disease, 698 (69.8 per cent) were smokers, whereas in the group of individuals without coronary disease there were 663 (66.3 per cent) persons who smoked. This represents an increase of only 3.5 ± 2.1 per cent of smokers among the patients who had coronary disease. However, when the analysis is carried further and the incidence of smokers in the various age groups is investigated, some marked differences become apparent. The incidence of smokers among 187 patients with coronary disease between the ages of 40 and 49 years was 149 (79.7 per cent) as contrasted with 187 smokers (61.9 per cent) among 302 in the group without coronary disease. This represents a difference of 17.8 ± 4 per cent,⁵ which is statistically

From the Section on Cardiology (Dr. Willius) and the Section on Biometry and Medical Statistics (Dr. Berkson), the Mayo Clinic.
Read before the Section on the Practice of Medicine at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.

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5. The figure after the sign \pm is the "standard error of the difference." If the difference is as large as twice the standard error it is generally considered "statistically significant" because only in five times out of 100 would so large a difference between the groups considered be expected to occur as a matter of chance, when there really was no difference. However, this applies to the general case of a difference in either direction, that is, for instance, here, regardless of whether incidence of smoking was greater or less in the group with coronary disease. Since here we actually consider as relevant only differences in one direction, that is, when the smokers are of greater frequency in the group with coronary disease, the equivalent rule is that a difference which is as large as 1.6 times its standard error is "significant." Such a difference in the relevant direction will occur by chance only five times in 100 when, in fact, there is no difference. In this instance the difference is more than four times its standard error.

significant. Comparison of the remaining age groups reveals no significant differences.

We then selected the consecutive records of 1,000 males 40 years of age and older on the basis of tobacco smoking only, recorded the degree of smoking, and determined the incidence of coronary disease among

TABLE 1.—Comparison of Incidence of Smokers in a Group of Males More Than 40 Years of Age Who Had Coronary Sclerosis with the Incidence in a Control Group of Similar Males Without Coronary Sclerosis

Age, Years	Coronary Sclerosis			Control: No Coronary Sclerosis			Difference Coronary Sclerosis Minus Control, per Cent	P *
	Total	Smokers		Total	Smokers			
		Num- ber	Per Cent		Num- ber	Per Cent		
40 to 49	187	149	79.7	302	187	61.9	+17.8	<0.001
50 to 59	382	274	71.7	371	274	73.9	- 2.2	
60 plus	431	275	63.8	327	202	61.8	+ 2.0	0.28
Total	1,000	698	69.8	1,000	663	66.3	+ 3.5	0.05

* The probability that as large a difference in the direction found would occur by chance in random samples, if actually there was no difference. The difference is considered "statistically significant" if the P is 0.05 or less. The P is given only when the difference is positive.

them. As a control to this group, 1,000 males 40 years of age and older were selected on the basis that they were not smokers and in this group the incidence of coronary disease was likewise obtained. Table 2 reveals the results of the analysis for these two groups. There were fifty-four instances (5.4 per cent) of coronary disease among the smokers in contrast with thirty-eight (3.8 per cent) among the nonsmokers. The difference is 1.6 ± 0.9 per cent, which is barely significant statistically.

However, when these two groups were subdivided into specific age groups the differences in the incidence of coronary disease among the smokers and the nonsmokers were more impressive. The incidence of coronary disease among smokers between the ages of 40 and 49 years was 4.8 per cent as contrasted with only

TABLE 2.—Comparison of Incidence of Coronary Disease in a Group of Male Smokers More Than Forty Years of Age with the Incidence in a Similar Group of Nonsmokers

Age, Years	Smokers			Control Nonsmokers			Difference Smokers Minus Control, per Cent	P *
	Total	Coronary Disease		Total	Coronary Disease			
		Num- ber	Per Cent		Num- ber	Per Cent		
40 to 49	208	10	4.8	208	2	1.0	+3.8	0.01
50 to 59	388	24	6.2	388	10	2.6	+3.6	0.01
60 plus	404	20	5.0	404	26	6.4	-1.4	
Total	1,000	54	5.4	1,000	38	3.8	+1.6	0.04

* The probability that as large a difference in the direction found would occur by chance in random samples, if actually there was no difference. The difference is considered "statistically significant" if the P is 0.05 or less. The P is given only when the difference is positive.

1.0 per cent in the same age group among the nonsmokers, revealing a difference of 3.8 ± 1.6 per cent, which is statistically significant. A similar situation prevailed in the age group of 50 to 59 years, in which the incidence of coronary disease among smokers was 6.2 per cent and among the nonsmokers was 2.6 per cent, indicating a difference of 3.6 ± 1.6 per cent, which is again statistically significant. Considering these last

two groups together, we see that the incidence of coronary disease in the group of smokers was relatively about three times that in the control group of non-smokers. Beyond 60 years of age no noteworthy differences were observed.

Although it was realized that the degree of smoking could be graded with only approximate certainty from the records, an attempt was made to see whether the data would reveal any correlation between the incidence of coronary disease and the degree of smoking. For this purpose the males between the ages 40 and 49 years were chosen, since it was in this group that the difference in incidence of coronary disease was most apparent. The nonsmokers were compared with the smokers, the latter grouped into those who were graded as smokers of degrees 1 and 2 and those who were graded degrees 3 and 4. The results are shown in table 3, in which it is seen that for nonsmokers, smokers of degrees 1 and 2 and smokers of degrees 3 and 4 the incidences of coronary disease were respectively 1.0 per cent, 4.6 per cent and 5.9 per cent. Although the numbers in each of the groups are too small to establish the rise in incidence of coronary disease with increasing degree of smoking in a "statistically significant" sense, the general rise in incidence with increasing degree of smoking is consistent with the other observations of this investigation.

TABLE 3.—Analysis of Influence of Grade of Smoking on Incidence of Coronary Disease

Males, Ages 40 to 49 Years, Inclusive Smokers and Nonsmokers			
Degree of Smoking	Total Cases	Coronary Disease	
		Number	Per Cent
None	208	2	1.0
1 to 2	174	8	4.6
3 to 4	31	2	5.9

COMMENT

In the interpretation of these statistics, certain facts must be borne in mind. The data were obtained from the records of a large clinic and cannot therefore be representative of material that could be derived from the general population, in which a lesser incidence of pathologic conditions obviously occurs.

However, from the material comprising this study it appears that a greater incidence of coronary disease occurs among smokers than among nonsmokers in the younger age group, that is, less than the age of 50 years and perhaps also among those in the age group 50 to 59 years (table 2). This, however, is not true in the older age groups. Furthermore, the incidence of coronary disease among patients less than 50 years of age was greatest among excessive smokers, was least among nonsmokers and occupied an intermediary position among moderate smokers.

It is therefore probable that the smoking of tobacco has a more profound effect on younger individuals owing to the existence of relatively normal cardiovascular systems, influencing perhaps the earlier development of coronary disease. In the older age groups, in which arterial changes are prominent regardless of extraneous influences such as smoking, the possible harmful effects of tobacco smoke are less evident than the other factors concerned in the production of atherosclerosis.

ABSTRACT OF DISCUSSION

DR. FRANCIS D. MURPHY, Milwaukee: The prodigious increase in consumption of tobacco after the first world war corresponds in time with the growing concern over diseases of the coronary arteries of the heart. The belief is spreading that the smoking of tobacco has an unfavorable influence on the course of coronary disease. However, White and Sharber in 1934 stated that the incidence of coronary heart disease is even higher in nonsmokers than in smokers. Therefore with particular interest I view the report of Drs. English, Willius and Berkson. From table 1 it appears that smoking has little influence on the incidence of coronary sclerosis. But there is a decided contrast between the 80 per cent incidence of smokers among patients with coronary disease and the 62 per cent incidence of smokers in a noncardiac group. Probably the authors' most striking observation concerned the incidence of coronary disease among nonsmokers, which was 1 per cent as compared with 6 per cent among heavy smokers. One may conclude from laboratory and clinical investigations and statistical reports that smoking is not an innocent habit; it may even be a contributory etiologic factor in coronary disease. Observations convince me that smoking is a distinct menace to patients with hypertension and coronary disease and that it may provoke an attack of angina and auricular fibrillation. When one of my patients, a physician, stopped smoking, the attacks left him but came back as soon as he resumed smoking. It is generally agreed that all patients with coronary disease should discontinue smoking; yet it must be recognized that there is great variation in individual patients' tolerance to tobacco. Some claim that smoking improves the coronary circulation and that attacks become less. In view of these facts one's advice should be tempered accordingly, but a rather strong case is being built up against tobacco, especially in individuals who are past 40 with evidence of coronary disease. This excellent report is a significant contribution to the subject of smoking and coronary disease from two points of view: First, the intrinsic value of the data submitted is of vital and practical importance; and second, it will stimulate others to make a comparative study of their own material in a similar way, so that a final appraisal of the influence of tobacco on the heart may be given.

DR. GEORGE R. HERRMANN, Galveston, Texas: It is only by impartial analyses of great masses of clinical material that is not available to many of us, of carefully studied patients, that we can hope to arrive at a fair-minded conclusion and an approximately true conception of the real effects of tobacco smoking. Drs. English, Willius and Berkson have selected what seems to be the most rational approach and have included proper controls as far as such are possible. In this study, as in most biologic statistical work, there are many minor variables that cannot be taken into consideration. The authors have had to omit many of these, which, if included, would probably have done nothing more than perhaps obscure the chief issue. Each one's own relatively and statistically insignificant experiences, especially recent, have a tendency to bias one. We see only the few sick smokers and lose sight of the great number of smokers who have no symptoms to cause them to consult us. We realize this fully, and yet we are likely to be obsessed and unduly influenced by our meager clinical experiences. The association of tobacco smoking in thrombo-angiitis obliterans and other vascular disease has greatly impressed those who have been interested in peripheral circulation. The question of what part is played by some patients' tendency to become sensitized to the drug, while most individuals develop a tolerance to it, might be raised even after this extensive study. It would be desirable to have in addition similar data on 1,000 smokers, all who feel dizzy or nauseated with the first smoking in the morning or whose extremities get cold and clammy or whose electrocardiograms show definite abnormalities during and following smoking, to be contrasted with data from 1,000 smokers who have a tolerance. That may have been taken into account. What percentage of these patients in each group were allergic? Are such patients more likely to suffer damage? Is one justified in insisting on absolute interdiction of the use of tobacco by all patients who have not developed a tolerance for the drug? These conditions should be indications for stopping smoking as well as anginal symptoms and coronary thrombosis.

We should be able to say before the age of 40 years what ones are likely to be in for trouble. What will be our criteria? Are we not justified in interdicting tobacco smoking in those who exhibit such abnormal reactions? Drs. English, Willius and Berkson demonstrated a significant and to my mind a most important fact, distinctly greater prevalence of demonstrable coronary artery disease among tobacco smokers in the younger age groups. Does this not suggest that the vascular reactions that are known to occur as a result of the pharmacologic effects of nicotine in susceptible individuals contribute to an earlier degenerative coronary artery disease? Must they not be stopped short of the development of such lesions?

DR. SOMA WEISS, Boston: This interrelationship between tobacco smoking and coronary disease is an important one. The public is particularly interested in it. While there is justified suspicion that there may be an interrelationship, a causative interrelationship, between these two conditions, we must carefully examine the evidence for such a conclusion. Granted that smoking was more prevalent statistically among the younger group with coronary disease, does that justify the conclusion that smoking was responsible or was a contributing factor to coronary disease. All one can say is that smoking was more prevalent, but the interpretation of this finding is difficult. For example, one may give the interpretation that the temperament of the hard-working individual who is predisposed to coronary artery disease would make him the type of individual who would also smoke, but the fact that he is smoking does not justify a conclusion that the smoking *per se* is a causative or even a contributory agent of coronary disease. I should like to find out from Dr. Willius whether or not my remarks are justified.

DR. WILLIAM D. STROUD, Philadelphia: We are grateful to Dr. Willius for this careful analysis, but I am wondering whether we are justified in concluding that tobacco can produce or increase the rapidity with which arteriosclerosis or atherosclerosis develops. It appears to me much like the subject of the athlete's heart. We feel today that the reason many athletes die in their fifties or sixties of coronary disease is not that they were athletic but that they were born with a spasmogenic aptitude. They seem to inherit from their ancestors the tendency toward hypertension which contributes toward their coronary disease. They most likely would have developed coronary disease at the same time whether or not they had been athletes. This has been borne out by studies of Harvard and Yale and Oxford and Cambridge crews, and especially by an experience of some five or six years ago, when a Harvard crew returned to college after some fifty years—all were over 70. They entered a shell and rowed down the Charles River. The only man in the crew who had died was the coxswain! He died of coronary thrombosis. I think it is the same thing with tobacco, and fortunately we have an excellent antidote, which is alcohol! I should like to ask Dr. Willius if he agrees that it is a possibility that these individuals are born with a tendency toward this condition and might develop it whether they smoked or not. I think we should differentiate distinctly between tobacco as an etiologic factor in this condition and as a factor in producing symptoms. If a person who has arteriosclerosis, hypertension or atherosclerotic changes uses tobacco to excess he will develop symptoms more quickly or more definitely while smoking, and they will disappear if he gives it up.

DR. FREDRICK A. WILLIUS, Rochester, Minn.: We gave this problem a great deal of thought. I tried to state cautiously in my introduction that we did not assume that tobacco smoke—and you will not that we carefully avoided the use of the term "nicotine" but said "tobacco smoke," because we have reasons to believe that probably more than the chemical agent nicotine plays a part, was etiologic but suggested the possibility, owing to these observations, that it was a precipitating influence in the earlier development of coronary disease. It is perfectly true, and we agree, of course, with Dr. Weiss and with Dr. Stroud that many other factors enter into the problem—heredity, our manner of doing things, temperament, and so on and so forth, these imponderables that undoubtedly play a tremendous part in our destinies as we go through life. We were aware of the fact that in presenting this subject it would be controversial and that at this time physicians are not yet ready to agree on this increasingly important subject.

SULFANILAMIDE IN THE TREATMENT
OF ERYSIPELAS

A CONTROL STUDY

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Several years have passed since the introduction of sulfanilamide into clinical medicine, and from the great mass of literature amassed concerning this drug certain claims have been made. Undoubtedly sulfanilamide is valuable in combating infections caused by certain organisms, especially the streptococcal groups of infections, which include the streptococcal pneumonias, wound infections and septicemias, scarlet fever and erysipelas. Concerning erysipelas, we have thought it worth while to review our cases in which sulfanilamide was administered at the Boston City Hospital during the past two and one-half years and contrast them with the cases without sulfanilamide in the preceding two and one-half years.

Erysipelas is a disease of the lymphatic system of the skin characterized by a slightly raised, sharply demarcated, tender red spreading indurated area. It usually involves the face, arising from a minor trauma or infection frequently overlooked by the patient, and spreads rapidly to form the characteristic "butterfly distribution" which includes both zygomatic areas and cheeks connected by the bridge of the nose. It often involves the legs, especially when varicose veins or other vascular disturbances are present; it may complicate operative wounds and more rarely may occur on other parts of the body. Hoyne¹ has shown that the disease is usually acquired through contact and that trauma, however slight it may be, is necessary for erysipelas infection although less than 60 per cent of patients with facial erysipelas admit a history of injury. On the other hand, whenever erysipelas appears on any other portion of the body there is almost invariably a history of trauma such as an abdominal operation, herniotomy, a varicose ulcer of the leg or a simple abrasion.

The etiologic agent can usually be isolated from the skin involved; it is found to be limited to the lymphatics of the skin and to possess the immunologic and cultural characteristics of Lancefield's group A.² Keefer and Spink² isolated twenty-two strains in their studies, all of which were of the human type (Lancefield group A) and produced beta hemolysis on blood agar.

Erysipelas is an acute disease, the onset usually characterized by a chill or chills followed in from one to three days by the appearance of the cutaneous lesion, which spreads rapidly. The temperature quickly rises to from 102 to 104 F., persists at a high level for from two to four days and then subsides by lysis to normal around the eighth day³ on the average. Occasionally

the temperature returns to normal by crisis, and more rarely the course is afebrile. The lesions of the skin fade after the first week but do not disappear until several days after the return of normal temperature. Local complications occur in the form of abscess, cellulitis or necrosis, while the more uncommon generalized complications appear as nephritis, septicemia, bronchopneumonia or meningitis.

In general, uncomplicated erysipelas is a self-limited disease, but in the presence of complications it may become a serious and occasionally fatal condition. Age plays an important role in prognosis, with infants below the age of 2 years and adults beyond the fifth decade showing a high mortality rate. Below the age of 2 from 37 to 75 per cent⁴ of all patients may be expected to die, while in the older age groups the death rate rises with the age. In the series of 998 patients analyzed by Hoyne, Wolf and Prim⁴ at the Cook County Hospital from 1934 to 1938 inclusive the mortality in the fifth decade was 5 per cent, in the sixth decade 12.9 per cent, in the seventh decade 17.6 per cent and in the eighth decade 45.5 per cent. Hoyne¹ has also analyzed the 5,666 cases from 1912 to 1933 and found an average mortality of 12 per cent in all ages, the extremes being 8.1 per cent and 18.2 per cent. Between the two extremes of life the death rate is from 3 to 7 per cent. The presence of complications such as renal damage, cardiac conditions, obesity, diabetes and pneumonia all lend themselves to a guarded prognosis. The finding of blood cultures positive for the hemolytic streptococcus is of grave prognostic significance, especially with infants, in whom a septicemia usually proves fatal. It is generally conceded that an attack not only fails to confer immunity but seems to render the individual more susceptible.

A multiplicity of therapeutic measures have been advocated in the treatment of erysipelas, but few have proved useful. Ointment of ichthammol was formerly employed but has been found to be valueless and had the disadvantage of concealing the true appearance of the disease. Then hot wet boric acid or magnesium sulfate dressings enjoyed a brief popularity, but they seemed to enhance the development of abscesses and were abandoned. Tincture of iodine or mercurochrome has never found a place in the treatment of this disease. It was thought that intracutaneous injections of 2.5 per cent phenol or 1:1,000 mercury bichloride would be valuable in controlling the spread of the infection, but these were complicated by sloughing or poisoning in a number of cases and have been discontinued. Along these same lines nonflexible collodion has been suggested. The collodion was painted on the skin at least 1 inch beyond the margin of the lesion in an attempt to halt an advancing erysipelas. Some success has been obtained by the use of this method and it is still used occasionally.

Iced magnesium sulfate or boric acid applications applied locally have been used for many years, and it is felt that some relief of pain with fewer complications has been obtained. Ultraviolet and roentgen treatments to the lesions have also been found to be beneficial. Local applications of various antiviral creams have been suggested.

From the Fifth (Boston University) Medical Service, Boston City Hospital; Dr. Foley is director and Dr. Yasuna house officer of this service.

1. Hoyne, A. L.: Erysipelas: Some Observations Regarding 1,193 Cases, *M. Rec.* 141: 132-134 (Feb. 6) 1935.

2. Keefer, C. S., and Spink, W. W.: Studies of Hemolytic Streptococcal Infection: III. The Characteristics of Hemolytic Streptococci Isolated from Patients with Erysipelas, *J. Clin. Investigation* 16: 155-159 (Jan.) 1937.

3. Gordon, J. E., and Young, D. C.: Treatment of Erysipelas with Erysipelas Antistreptococcus Antitoxin, *J. Michigan M. Soc.* 28: 353 (May) 1929.

4. Hoyne, A. L.; Wolf, A. A., and Prim, Leona: Fatality Rates in the Treatment of Nine Hundred and Ninety-Eight Erysipelas Patients: The Influence of Sulfanilamide, *J. A. M. A.* 113: 2279-2281 (Dec. 23) 1939.

Birkhaug⁵ in 1926 first showed that the hemolytic streptococcus of erysipelas had a specific toxin which could be neutralized by an antitoxin. During the next few years serum was perfected, concentrated and used extensively. Symmers and Lewis⁶ at Bellevue Hospital are probably the outstanding advocates of serum. They have reported a series of 4,698 cases in which antitoxin was administered between 1927 and 1934. In their adult series their mortality was 6.9 per cent with antitoxin as compared with 9.2 per cent without antitoxin, while for infants the figures were 14 per cent mortality with antitoxin and 47.5 per cent without antitoxin. They felt that five out of 100 patients receiving the serum were not benefited because of the various strains of streptococcus causing erysipelas. Most observers⁷ who analyzed their results with serum felt that the mortality rates were diminished. However, in 520 cases McCann⁷ concluded that antitoxin had no effect on the course of the disease. His ten year study showed a mortality rate of 13 per cent with 58 per cent of patients having extensions of lesions in the serum treated group as compared with 15.5 per cent mortality and 35 per cent extension in the control group of 558 patients. Francis⁸ could not confirm the finding of soluble toxin in the circulating blood of patients with erysipelas as claimed by Birkhaug.⁵

During the past three years sulfanilamide has been used extensively in the treatment of erysipelas, and the majority of reports have been favorable. Snodgrass and Anderson⁹ compared 106 cases of erysipelas treated with sulfanilamide with a control group in which ultraviolet radiation was used. In 76 per cent of the drug treated patients the temperature was normal within forty-eight hours while only 48 per cent of the ultraviolet group had this result. Recurrences, complications and deaths were all significantly less with sulfanilamide therapy.

Meyer-Heine and Huguenin¹⁰ studied 150 cases treated with approximately 2 Gm. of sulfanilamide daily and regarded the drug as a specific therapeutic agent. In 98.5 per cent of their cases the course was one of rapid fall in temperature with subsidence of the local lesion within forty-eight hours. There were no deaths and few local complications.

Nelson, Rinzler and Kelsey¹¹ compared results in 344 sulfanilamide treated cases with the results for over 4,000 other cases in which various other therapies had been applied. They found the duration of fever to be shortened from 6.8 to 4.2 days, the mortality rate from 8.0 to 1.9 per cent and the hospital stay from 11.0 to 6.9 days. Forty-four per cent of their patients had a normal temperature within forty-eight hours, and only 3 per cent had local complications. The 382 adults treated with erysipelas antitoxin in their series

had a mortality rate of 9.2 per cent, an average hospital stay of 11.1 days and febrile period of 6.8 days.

Favorable results with sulfanilamide have also been obtained in small series by Peters and Havard,¹² Toomey,¹³ Hageman and Blake,¹⁴ Frankl,¹⁵ Breen and Taylor,¹⁶ Kramer¹⁷ and Rantz and Keefer.¹⁸

ANALYSIS OF CASES

We have studied the eighty patients with erysipelas admitted to our wards at the Boston City Hospital from June 1937 through December 1939 who have been treated with sulfanilamide and have compared them with the eighty preceding patients who did not receive sulfanilamide. This "control group" includes patients admitted from January 1935 to June 1937.

In general the patients entering the hospital during the past five years have been of the same social status with about the same environmental factors. The prognosis of erysipelas in the aged is comparatively poor, and in our series the average age in the control group is less than in the sulfanilamide group, 47 years and 52 years respectively. Thirty-six per cent of the patients in the control group as contrasted with 48 per cent of the sulfanilamide group were over 50 years of age, a decided advantage for the control group. Debilitating diseases such as heart disease, generalized arteriosclerosis, parkinsonism, emphysema, pneumonia, alcoholism and diabetes are known to modify the course of the disease unfavorably. One or more complicating diseases were present in fifteen (19 per cent) of the control group and in twenty-seven (31 per cent) of the sulfanilamide group. Blood cultures were done in only a small percentage of cases and so cannot be analyzed.

In the control group seventy patients had lesions which involved the face or ears, nine the legs and one the back, while in the sulfanilamide group sixty-nine patients had involvement of the face or ears, nine of the legs or thighs and two of the arms. The seasonal incidence in the two groups was about the same.

All patients in both the control and the sulfanilamide group received a fairly constant type of treatment consisting of forced fluids, catharsis, local applications of iced magnesium sulfate and symptomatic therapy. The average dose of sulfanilamide was 7 or 8 Gm. the first twenty-four hours and 5 or 6 Gm. each twenty-four hours thereafter. The average duration of the drug therapy was 4.5 days, with extremes of one and eight days.

In evaluating the results we used certain criteria which we felt would best demonstrate the comparison in an objective manner. These criteria were the duration of fever, the average hospital stay, the incidence of complications and the mortality. Accurate data as to the duration of the cutaneous lesions were not available.

The average duration of temperature from the time of admission to the return to normal of the drug treated patients was 2.94 days, as shown in the table. The

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6. Symmers, Douglas, and Lewis, K. M.: The Antitoxin Treatment of Erysipelas, with Observations on 4,698 Patients So Treated, *M. Clin. North America* 18:861-866 (Nov.) 1934.

7. McCann, W. S.: Serum Treatment of Erysipelas, *J. A. M. A.* 91:78 (July) 1928. Philpott, O. S.: The Use of Serum in the Treatment of Erysipelas, *Colorado Med.* 32:883-884 (Nov.) 1935. Gordon and Young.³

8. Francis, Thomas, Jr.: Studies on Pathogenesis and Recovery in Erysipelas, *J. Clin. Investigation* 6:221 (Oct.) 1928.

9. Snodgrass, W. R., and Anderson, Thomas: Prontosil in the Treatment of Erysipelas: Controlled Series of Three Hundred and Twelve Cases, *Brit. M. J.* 2:101-104 (July 17) 1937.

10. Meyer-Heine, André, and Huguenin, Pierre: Traitement de l'érysipèle par le chlorhydrate de sulfamido-chryodine, *Presse méd.* 44:454-457 (March 18) 1936.

11. Nelson, John; Rinzler, Henry, and Kelsey, M. P.: Sulfanilamide Treatment of Erysipelas, *J. A. M. A.* 112:1044 (March 18) 1939.

12. Peters, B. A., and Havard, R. V.: Chemotherapy of Streptococcal Infection with *p*-Benzylamino-Benzene-Sulfonamide, *Lancet* 1:1273 (May 29) 1937.

13. Toomey, J. A.: Prognosis and Treatment of Erysipelas, *Ann. Int. Med.* 12:166-177 (Aug.) 1938.

14. Hageman, P. O., and Blake, F. G.: Clinical Experience with Sulfanilamide in the Treatment of Beta Hemolytic Streptococcal Infections, *Am. J. M. Sc.* 195:163-175 (Feb.) 1938.

15. Frankl, J.: Ueber den Wert des Prontosil in der Therapie des Erysipels, *Klin. Wchnschr.* 15:1563-1567 (Oct. 24) 1936.

16. Breen, G. E., and Taylor, Ian: Erysipelas Treated with Prontosil, *Lancet* 1:1334-1336 (June 5) 1937.

17. Kramer, Wilhelm: Ueber Erfahrungen bei der Erysipellbehandlung mit Prontosil, *München. med. Wchnschr.* 82:608-610 (April 10) 1936.

18. Rantz, L. A., and Keefer, C. S.: Sulfanilamide in the Treatment of Erysipelas, *New England J. Med.* 221:809-813 (Nov. 23) 1939.

decline in temperature was progressive in almost all cases, usually taking the form of rapid lysis, and rarely was a recurrence seen following the institution of sulfanilamide. In the control group the average duration of temperature was 4.74 days, and in this group the temperature frequently rose on the second or third day to a new high level before returning to the base line. The average admission temperature was 102.2 F. in the control group and 101.8 F. in the treated group, with extremes of afebrile states and 105 F.

The average hospital stay of the drug treated group was 10.0 days, as compared with 12.9 days for the control group. In a small number of cases the hospital stay was markedly prolonged by factors unrelated to the erysipelas, and in these instances the hospital stay was calculated from the duration of the course of the erysipelas. The duration of hospitalization of patients receiving sulfanilamide was therefore shortened by almost three days, this time representing a substantial saving of time by the patient and of money by the hospital.

Seven patients (9 per cent) in the sulfanilamide group had complications, two of which ended fatally. The two deaths were similar in type, the patients having persistent oliguria and dying of uremia. Other complications consisted of infectious arthritis in two cases

Results of Sulfanilamide Treatment in Erysipelas

Course in Hospital	Sulfanilamide-Treated Subjects	Controls
Average duration of temperature.....	2.94 days	4.74 days
Average hospital stay.....	10.0 days	12.9 days
Complications.....	7 cases (9%)	18 cases (22%)
Mortality.....	2 cases (2.5%)	8 cases (10%)

and one each of parotitis, periorbital infection, infected wen and pneumonia. In no instance was there a spread of the lesion, although this was watched for carefully. In the control group complications developed in eighteen cases (22.5 per cent), eight of which ended fatally. Ten patients exhibited a definite spread of the lesion to adjacent areas, usually the ears, forehead and neck. One of these contracted a Streptococcus haemolyticus septicemia and died, while another became very toxic, with a high temperature and disorientation, and died. The remaining eight patients recovered. Other complications consisted of four cases of pneumonia, all ending fatally, three cases of abscess of the eyelid with recovery, one case of nonfatal nephritis and one case of probable lateral sinus thrombosis with death.

The mortality rate was 2.5 per cent in the drug treated group and 10.0 per cent in the control series. One patient treated with sulfanilamide had made a complete recovery and was awaiting discharge when she suddenly dropped dead. Autopsy revealed a large pulmonary embolism. This case was not included in the mortality rate. In the control group one patient had erysipelas and made a fair recovery only to die a few weeks later from cardiac decompensation. This case was not included in the mortality figures.

No severe blood dyscrasia such as hemolytic anemia or granulocytopenia was experienced among the eighty patients receiving sulfanilamide. Cyanosis, nausea, anorexia, moderate malaise and mild anemias were frequently encountered, but in no instance were any of these sufficiently severe to warrant discontinuance of the drug.

COMMENT

It has been repeatedly shown that the action of sulfanilamide on the hemolytic streptococcus in vitro is one of bacteriostasis¹⁹ with almost no bactericidal effect. To obtain bacteriostatic effect, however, adequate concentration of the drug must be maintained in the blood as shown by Long and Bliss¹⁰ and Colebrook and his associates¹⁹ in mice. These workers have shown that the withdrawal of the drug would then cause these animals to succumb, presumably because active immunity against the organism failed to develop. To apply this work to man, we found in our group of cases that the temperature returned to normal in about three days. The drug was discontinued after 4.5 days on the average (with extremes of one and eight days). If the work in mice applied to human beings, one would expect a certain number of patients to have relapses on stopping the drug since little or no active immunity would be developed by the patient during sulfanilamide therapy. Actually, this did not occur in a single instance, and therefore it seems probable that active immunity is developing during sulfanilamide therapy and that this immunity protects the patient on withdrawal of the drug.

It has been held by some¹⁸ that sulfanilamide cannot be expected to effect immediate cures in erysipelas since the development of immune bodies must be awaited. It is further stated that the fall in temperature in erysipelas is presumably due to the development of antistreptococcus immune bodies in the afflicted individual. If this were so one would expect a return to normal temperature about the same time in uncomplicated cases with sulfanilamide treatment and control cases, since the immune body production is apparently the same in the two groups. On the contrary, however, the return of the temperature to normal was 2.9 days with sulfanilamide as contrasted with 4.7 days in the controls. Spink and Keefer²⁰ have shown that the height of anti-streptolysin titer is obtained within the first twenty days and may remain elevated from forty days to six months. Moreover, they found no relation between the time of recovery and the presence of increasing amounts of antibodies in the blood.

Analysis of average hospital stay, duration of fever, incidence of complications and mortality rates all favored the sulfanilamide treated group, as can be seen in the table. In addition, the control group represented the more favorable cases from the point of view of prognosis, since the average patient was five years younger than in the sulfanilamide group, and the incidence of complicating medical diseases was lower. Thus it appears that the patient with erysipelas who receives sulfanilamide will have a more benign course with much less chance of developing complications than the untreated patient.

A few words should be said about the cases ending fatally. In the control group all the deaths resulted from overwhelming toxic infection due to erysipelas

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20. Spink, W. W., and Keefer, C. S.: Studies of Hemolytic Streptococcal Infection: II. The Serological Reactions of Blood During Erysipelas, *J. Clin. Investigation* 15:21-35 (Jan.) 1936.

with a terminal complication such as septicemia or pneumonia which accelerated the death. In the sulfanilamide group no case of overwhelming infection was seen. Two deaths did occur but they were of a different type from those seen in the untreated group. These cases require special comment:

CASE 1.—A woman aged 34 was admitted to the hospital April 19, 1939, with typical facial erysipelas involving the nose, both cheeks and part of the forehead. The admission temperature was 100.4 F. and the patient did not appear toxic. She was given sulfanilamide 90 grains (5 Gm.) a day for six days, and the temperature returned to normal by the third day. The facial lesion started to recede. By the fifth day the erysipelas had subsided almost completely, but oliguria developed. Vigorous efforts to overcome this with parenteral fluids without salt, 50 per cent dextrose given intravenously and sodium bicarbonate intravenously were all unsuccessful. The nonprotein nitrogen level rose progressively from 50 mg. to 240 mg. per hundred cubic centimeters. The temperature remained normal except for the last two days, and a Mosenthal test showed inability to concentrate the urine. The patient had a uremic type of death on the seventeenth hospital day. Permission for autopsy could not be obtained.

CASE 2.—A woman aged 67 entered the service with a three day history of facial erysipelas. Sulfanilamide was given for forty-eight hours and then discontinued because of oliguria. The facial lesion did not spread and the temperature returned to normal in two days, but the patient remained drowsy. It was found that the nonprotein nitrogen values were rising, and forced parenteral fluids were given unsuccessfully. Urinalyses were suggestive of nephritis, and the patient had a uremic death on the eighth hospital day. Autopsy revealed large engorged red kidneys; the microscopic sections are still being studied.

It is interesting to note that both patients had a renal death. In one case the facial erysipelas had cleared, and in the other it was under control. The question arises whether the kidney shutdown was caused by the disease or by the sulfanilamide. The answer cannot be given at present, but further work is being done along these lines. Perhaps poor kidney function is a contraindication in the use of sulfanilamide.

SUMMARY AND CONCLUSIONS

In eighty cases of erysipelas sulfanilamide treatment was given and the results were compared with those in eighty similar cases in which sulfanilamide was not used.

It was found that the drug treated patients returned to a normal temperature almost two days earlier than the controls.

The hospital stay was shortened three days for the sulfanilamide treated patients.

Complications occurred twice as frequently in the control group as in the treated group.

The mortality rate in the sulfanilamide group was one fourth that of the untreated group.

Two patients in the erysipelas group died in uremia from kidney shutdown after the erysipelas had been brought under control. It is possible that they represent complications of sulfanilamide.

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Twelve Calories for Every Pound of Body Weight.—

A man lying quietly in bed throughout the twenty-four hours of the day uses at least twelve calories for every pound of body weight, which means for an average man a daily total of from 1,600 to 1,800 calories.—Rose, Mary Swartz: Feeding the Family, New York, Macmillan Company, 1940.

VERATRUM VIRIDE IN THE TREATMENT OF ECLAMPSIA: II

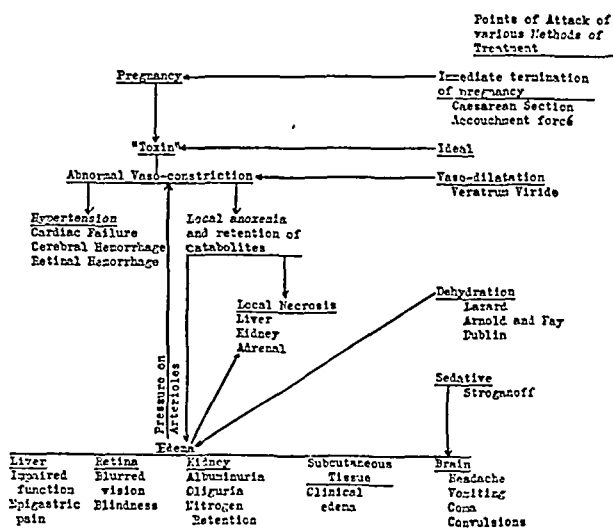
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In 1935, one of us¹ reported a series of cases of eclampsia treated at the Cincinnati General Hospital during the previous ten years. The use of the vaso-dilating drug veratrum viride was stressed. Previously this drug had been used with success by Dr. William Gillespie as chief of the obstetric service until his death in 1925. Since then under his successor, Dr. H. L. Woodward, and his attending staff details of the management of eclampsia have been further refined and improved. Since 1930 there have been but minor variations in the treatment. We believe that a sufficient number of cases have been treated successfully to justify the conclusions that veratrum viride is an extremely valuable adjunct in the management of eclampsia and that the drug itself is not a source of



Theoretical sequence of events in eclampsia.

danger to the patient (as is stated in a current standard textbook) if used in therapeutic doses.

The present series includes 120 cases. Fifty-four of the cases were embraced within the previous communication, but in order to group the entire series in which the same standardized treatment was used they are here combined with the sixty-six cases treated since 1935. There were only two deaths in the entire series, a mortality rate of 1.67 per cent.

Since the previous communication considerable experimental, clinical and pathologic evidence has accumulated to confirm our earlier stated belief that many, if not all, of the phenomena which make up the clinical picture of eclampsia are immediate or remote consequences of abnormal vasoconstriction of the entire arteriolar tree. As a result a therapeutic agent used empirically for many years now stands forth in the light of newer knowledge as eminently rational. The

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accompanying chart illustrates graphically a theoretical sequence of events in eclampsia, as well as the point of attack of various popular methods of treatment.

In antepartum and intrapartum eclampsia, immediate termination of the pregnancy has been almost abandoned because of the very high mortality rate following this

TABLE 1.—Initial Convulsions in Relation to Labor

	Number of Cases
Antepartum.....	56
Intrapartum.....	18
Postpartum.....	46
Hospital delivery.....	37
Admitted post partum.....	9
	120

procedure. The ideal method of treatment would be to neutralize or counteract the so-called toxin produced by the pregnancy and resulting in generalized vasoconstriction and eclampsia. Because no such "toxin" has been demonstrated, this method cannot be followed. We feel that the treatment discussed in this and the previous paper attacks the disease process as near its source as present knowledge and technic permit. Treatment by either dehydration or sedation alone appears to be purely symptomatic.

Division of the cases in this series on the basis of initial convulsions in relation to labor is shown in table 1.

The greatest difficulty was encountered, naturally, in the antepartum group of cases, in which the problem of induction of labor was added to the purely medical problem of management of the acute eclamptic state. The intrapartum cases were somewhat less difficult; the labor and delivery were treated conservatively, as if the patient were not toxic. The second stage was shortened, if indicated, when reasonably safe and easy. The postpartum cases were the least difficult to treat, as the only problem was the control of, and prevention of further, convulsions.

TABLE 2.—Antepartum Eclampsia: Methods of Induction of Labor

	Number of Cases
Spontaneous onset of labor (no induction required).....	13
Medical induction *	1
Stripping of membranes † plus medical induction.....	7
Rupture of membranes	3
Bag (alone, or medical)	28
Others	4
Pack in conjunction with stripping of membranes and medical induction	2
Bag plus pitocin	1
Pack plus bag.....	1
Total.....	56

* Two ounces (60 cc.) of castor oil and 15 grains (1 Gm.) of quinine in divided doses, followed by a hot enema.

† Sterile vaginal examination with digital separation of membranes from the lower uterine segment.

The methods of inducing labor in the fifty-six antepartum cases are shown in table 2.

It might have been possible in many cases of antepartum eclampsia to carry the patient for days or even weeks, until labor set in spontaneously. However, with rare exceptions, this procedure was wholly impracticable because of the prolonged hospitalization necessary for the close observation required. In general, then, termination of the pregnancy represented the final step in the treatment of antepartum eclampsia.

The induction of labor was regarded as a gradual and progressive process, with as little regard as possible for definite time limits. It was observed that, if sufficient time was given to proper treatment of the complicating eclamptic state, labor often ensued spontaneously. Uterine contractions set in spontaneously in thirteen, or 23.2 per cent, of the cases of antepartum eclampsia in this series (table 2).

The biggest single factor influencing the decision to induce labor was the general condition of the patient. Ideally, we believe, no really active induction should be undertaken until there are complete return of consciousness, absence of all subjective symptoms, diminishing edema and an adequate output of urine, with a decrease in albuminuria and the number of casts. The blood pressure level is not of itself of paramount importance if the aforementioned conditions are met. However, in most cases it seemed safe and even wise to begin what we consider preparatory steps for induction of labor even before complete control of the toxemia was achieved.

In this series the elastic bag was the most effective agent for inducing labor. However, because its use involves intravaginal and intra-uterine manipulation and because a certain amount of cervical dilatation is required before it can be used, other and simpler pro-

TABLE 3.—Antepartum Eclampsia Requiring Induction of Labor: Time Required to Achieve Complete Control of Convulsions

	Number of Cases	Per Cent	Cumulative Per Cent
No convulsions after treatment was started	25	58.1	58.1
Convulsions controlled within 15 minutes.....	9	20.9	79.0
Convulsions controlled within 30 minutes.....	5	11.6	90.6
Convulsions controlled within 60 minutes.....	1	2.3	92.9
Longer than one hour required.....	3	7.1	
Total cases	43	100.0	

cedures were usually tried first. These procedures might be called preparatory, although they themselves sometimes brought on labor. Labor occurred spontaneously in 23.2 per cent of the cases, the only manipulation having been a simple rectal examination or several repeated examinations. Medical induction, consisting of administration of castor oil, quinine and a hot enema, was next tried. If labor had not begun after twenty-four hours, the cervix was usually found to have benefited from the increased pelvic congestion, as indicated by softening of the cervix and shortening of the cervical canal.* The membranes were then stripped away from the lower segment by sterile vaginal examination, and this was followed by medical inductive measures. If these measures failed, after another twenty-four hours they were repeated or the membranes were ruptured. If conditions were not favorable for rupturing the membranes, and if cervical dilatation of at least one fingerbreadth was present, a bag was introduced extra-ovularly. In either case labor soon ensued. The membranes were always ruptured when the bag was expelled and delivery was awaited expectantly. A long, hard, closed cervix, usually in a primipara, occasionally proved intractable to the aforementioned preparatory measures. Rarely it was necessary to pack the cervix for twenty-four hours before a bag could be introduced. Instrumental dilation of a closed cervix for the purpose of achieving enough dilatation for introduction of a bag was not resorted to because of the danger of tearing rather than dilating the cervix.

We regard this progressive preparation for the induction of labor as one of the fundamental factors in the management of antepartum eclampsia and one which must be observed if good results are to be obtained. In the forty-three cases of antepartum eclampsia in this series requiring induction of labor, the average interval

TABLE 4.—*Entire Series: Number of Convulsions After Treatment Was Started*

	Number of Cases	Per Cent	Cumulative Per Cent
No convulsions after treatment was started	74	61.7	
One convulsion after treatment was started	34	28.3	90.0
More than one convulsion after treatment was started	12	10.0	
2 convulsions	6 cases		
3 convulsions	2 cases		
4 convulsions	1 case		
5 convulsions	1 case		
6 convulsions	1 case		
14 convulsions	1 case		
12 cases			
Total cases	120	100.0	

between the apparent control of convulsions and the initial attempt to induce labor was fifty-seven hours and fifty-two minutes. In the same group of cases the average interval between the initial attempt at induction and delivery was forty-eight hours and forty minutes. The sum of these two figures, 106 hours and thirty-two minutes, or almost four and a half days, represents the average interval between the time when the convulsions were apparently under control and delivery. While termination of the pregnancy remains an essential feature of the management of antepartum eclampsia, we believe that a happy outcome depends in a large measure on the choice of the proper time for undertaking this potentially dangerous operation.

The difference between the radical management of antepartum eclampsia and the induction of labor as used in this series of cases lies in the timing of termination of the pregnancy and the purpose for which it is done. With the radical treatment the baby is delivered for the express purpose of stopping the convulsions; with conservative methods of treatment, such as the one under discussion, the pregnancy is terminated only after the eclampsia is well controlled and for the purpose of preventing recurrence of the entire acute toxic state. Any method of treatment using the latter principle must therefore include measures which completely control the acute toxemia and maintain control for as long a

TABLE 5.—*Entire Series: Time Required to Achieve Complete Control of Convulsions*

	Number of Cases	Per Cent	Cumulative Per Cent
No convulsions after treatment was started	74	61.7	61.7
Convulsions controlled within 15 minutes...	15	12.5	74.2
Convulsions controlled within 30 minutes...	8	6.7	80.9
Convulsions controlled within 60 minutes...	3	2.5	83.4
Longer than one hour required.....	20	16.6	
	120	100.0	

period as is necessary. That this objective was accomplished with marked success in the cases of antepartum eclampsia in which induction of labor was required is demonstrated in table 3.

To this factor—the ability to maintain complete control of the eclampsia until labor could be induced under advantageous conditions, even when a number of days were required—may be attributed much of the success obtained with antepartum eclampsia in this series.

For the entire series of 120 cases, the figures on the control of convulsions are interesting, as revealed in tables 4 and 5.

At delivery, operative methods were reduced to a minimum because of the increased susceptibility to infection and the low tolerance to prolonged anesthesia characteristic of eclamptic patients. The methods of delivery in the entire series of cases is shown in table 6.

Infections occurred considerably more frequently than in the average obstetric census. Following the accepted standards of morbidity, table 7 reveals this increased morbidity rate.

Only two deaths occurred among the 120 cases in this series, a mortality rate of 1.67 per cent. Both presented unusually difficult problems, as a summary of their clinical course shows.

REPORT OF CASES

CASE 1.—A Negress, aged 19, a primipara near term, was admitted to the hospital in coma after having had five convulsions at home and en route to the hospital. The blood pressure on admission was 170 systolic, 130 diastolic, and a catheterized specimen of urine showed 3 plus albumin. Our standard medical treatment for eclampsia was instituted. Two

TABLE 6.—*Entire Series: Methods of Delivery*

	Number of Cases
Antepartum eclampsia.....	56
Spontaneous delivery.....	35
Forceps.....	13
Version and extraction.....	4
Breech.....	3
Embryotomy.....	1
Intrapartum eclampsia.....	18
Spontaneous delivery.....	8
Forceps.....	8
Breech.....	1
Embryotomy.....	1
Postpartum eclampsia.....	37
Spontaneous delivery.....	30
Breech.....	4
Forceps.....	3
Delivered before admission.....	9
Total.....	120

minutes after treatment was started a convulsion occurred. There were no further convulsions, and the toxemia per se offered no major difficulty. Forty-eight hours after the last convulsion a vaginal examination revealed a long closed cervix. A medical induction resulted only in false labor. On the fifth day the cervix and lower uterine segment were packed. After twenty-four hours the temperature rose to 103.8 F. and the pack was removed. On the seventh day the cervix was still firm and edematous and dilated but one fingerbreadth. An attempt to insert a Braun bag was unsuccessful, although fairly good labor pains ensued. Twenty-four hours of labor produced no change in the cervix.

Finally, 163 hours after the last convulsion, the cervix was dilated manually and a stillborn baby was delivered by high forceps. Bilateral cervical lacerations and a deep perineal and sulcus tear resulted. On the second day post partum the temperature began a septic rise and on the fifth day there was a moderate postpartum hemorrhage from the necrotic cervix and perineum, requiring secondary suturing. Thereafter the course was that of fulminating sepsis, death occurring on the fourteenth day post partum.

The principal postmortem observations were acute endocervicitis and endometritis, with multiple secondary pulmonary abscesses and generalized sepsis. Marked degenerative changes, consisting of both central and midzonal necrosis, were present in the liver. The kidneys showed only toxic changes, mainly cloudy swelling of the tubules.

CASE 2.—A Negress, aged 42, a secundipara pregnant for the fourth time (approximately eight months), was admitted to the hospital in acute cardiorespiratory distress. Three previous

pregnancies had resulted in a miscarriage and two stillbirths. There was a history of severe asthma and of irregular anti-syphilitic treatment. The blood pressure was 210 systolic, 76 diastolic; there were 3 plus albumin and massive peripheral edema. Because the major features were those of acute cardiac failure rather than of acute toxemia, the patient was transferred to the medical service, where venesection and digitalization brought little improvement. Twenty-four hours after the administration of mercupurin (a mercurial diuretic) the patient had a generalized convulsion. Antieclamptic treatment was instituted and no further convulsions occurred.

On the fourth day after admission the membranes ruptured spontaneously. Labor failed to set in after two attempts at medical induction, so a bag was inserted. The patient's heart failed to respond to treatment and an oxygen tent was required throughout labor. Finally a stillborn baby was delivered by version and extraction (after attempted high forceps delivery) on the seventh day after the convulsion. The placenta failed to separate, and a brisk hemorrhage necessitated manual removal of the placenta.

During labor the temperature rose to 105 F. and thereafter continued a variable septic course. On the twenty-fifth day post partum a left gluteal abscess was incised and drained, and on the forty-ninth day a left subphrenic abscess required the same treatment. After this the course was rapidly downhill, with evidence of generalized peritonitis. On the sixty-fifth day post partum a right subphrenic abscess was drained. The patient failed to rally and died seven hours later.

TABLE 7.—*Entire Series: Morbidity**

Hospital Deliveries	Number of Cases
No morbidity	48
Morbidity	31
One day fever	18
Intrapartum fever	6
Intrapartum fever plus morbidity	4
Intrapartum fever plus one day fever	4
Admitted post partum	111
Total	9
	120

* No morbidity: temperature remaining under 100.4 F. after the first 24 hours post partum.

One day fever: temperature of 100.4 F. or over in only one 24 hour period after the first 24 hours.

Morbidity: temperature of 100.4 F. or over on any two consecutive days, not including the first 24 hours after delivery.

Intrapartum fever: temperature of 100.4 F. or over during labor.

It is evident that in neither case did the patient die of toxemia of pregnancy or because of the failure of the treatment for eclampsia, which was under complete control long before even the induction of labor was attempted. Such deaths may be prevented only by improvements in our methods of inducing labor and of delivery.

There were 129 babies (including nine sets of twins) born to the 120 mothers in this series. The incidence of twins was one set in 13.3 cases, almost five times the average incidence for all deliveries. This substantiates the belief that toxemia and eclampsia occur more frequently in multiple pregnancies than in single pregnancies. The records of four of the babies were mislaid, but of the remaining 125 thirty-six died, a gross mortality rate of 28.8 per cent. Antepartum eclampsia was fatal for the baby nearly twice as often (42.8 per cent) as was intrapartum (22.2 per cent) or postpartum (17.4 per cent) eclampsia.

The question of a control series of cases has often arisen, but the idea has always been abandoned. It obviously would be unfair to the patient with convulsions to deny her a treatment which is nearly 100 per cent effective (it actually was 100 per cent effective in this series, because in every one of the 120 cases, including the two patients who died, the acute eclampsia state was completely controlled). Further-

more, since somewhat similar methods of treatment have been reported from other clinics with less favorable results, we feel that the difference in results may be attributed to the incorporation of veratrum viride as a therapeutic agent in our system of treatment of eclampsia.

The actual details of treatment may be illustrated best, perhaps, by quoting the set of orders which might be written for a patient with eclampsia. These would read as follows:

1. Give 10 minims (0.6 cc.) of veratrum viride immediately; repeat every ten to fifteen minutes until the pulse rate is below 60 or the blood pressure is below 120 systolic; thereafter, until the patient is conscious, repeated in 3 to 10 minims (0.2 to 0.6 cc.) doses if the pulse rate goes over 80 or the blood pressure over 150 systolic; after the patient is conscious and cooperative, give 3 to 10 minim doses if the patient is nauseated or has severe headache, marked visual disturbances or epigastric pain or convulsions.
2. Give 10 cc. of 50 per cent magnesium sulfate by deep injection immediately, 5 cc. every six hours for four doses and then 5 cc. every twelve hours for four doses.
3. Give 500 cc. of 20 per cent dextrose intravenously at once; repeat every six to ten hours until consciousness returns.
4. Catheterize and give a soapsuds enema immediately.
5. Check the pulse and blood pressure hourly as long as coma persists, then every two to four hours while the patient is awake.
6. Force fluids (5,000 cc. daily) by mouth as soon as possible.
7. Give no sedatives except for extreme restlessness or labor.
8. Institute a diet free of salt as soon as tolerated.
9. Measure the fluid intake and the urinary output; examine the urine daily for albumin.

The usual precautions are observed during convulsions and coma. A mouth gag is kept available for protecting the tongue; postural drainage is used when saliva and mucus are excessive. No effort is made to isolate the patients; they are kept in the open thirty bed ward. Parenthetically it may be noted that the three commonest causes of restlessness in semicomatose patients are a full bladder, a full rectum and labor pains. A modified Gwathney technic is used during labor.

The effect of hypodermic injection of a therapeutic dose of veratrum viride is startling and may cause undue alarm to those unused to seeing it. The blood pressure falls rapidly, sometimes to as low as 50 systolic. This marked fall is transitory but is followed by a more or less prolonged period during which the pressure is well below the original level. The heart beat is slowed to 40 per minute in some cases but it soon picks up and remains at 60 to 80 until the effect of the drug has worn off. The pulse rate usually follows the blood pressure level fairly closely. Atropine or morphine sulfate or both are antidotes for veratrum viride; neither was needed in this series. Vomiting is an early effect. The vomitus is copious and usually green or black, possibly indicating excretion of toxic materials from the liver. The degree of vomiting varies with the individual susceptibility of the patient. The respiration is always slowed considerably but never to such a degree as to be harmful.

It should be emphasized that individual susceptibility to the drug is marked. For this reason the treatment cannot be absolutely standardized. The size and number of doses can be gaged only by the reaction of the patient.

COMMENT ON THE ACTION OF VERATRUM VIRIDE

If the initial premise—that abnormal vasoconstriction is a fundamental pathologicophysiological phenomenon in eclampsia—is correct, then elevated blood pressure

TABLE 8.—Course of a 22 Year Old White Primipara Admitted at Term and in Coma After Four Convulsions

Date and Time	Clinical State	Treatment
4/22/36		
2:10 p. m.	Admitted semicomatose and restless; B. P. 164/126; P. 84; T. 98.2 F.....	Magnesium sulfate (50%) 10 cc. deep injection; veratrum viride, 10 minims hypodermically
2:15 p. m.	Severe headache	
3:00 p. m.	Vomiting, perspiring	
3:20 p. m.	B. P. 110/60; P. 60; fairly quiet.....	Dextrose (20%) 400 cc. intravenously
3:35 p. m.	Catheterized-250 cc.; albumin +++	
3:45 p. m.	High soapsuds and tap water enema	
5:00 p. m.	Quiet, cooperative	Magnesium sulfate (50%) 5 cc. deep injection
6:30 p. m.	B. P. 118/74; P. 48; taking fluids by mouth	
7:00 p. m.	B. P. 110/70; P. 58	
8:00 p. m.	Sleeping; P. 48	
11:30 p. m.	B. P. 148/88; P. 48	
12:00 m.	B. P. 128/70.....	Magnesium sulfate (50%) 10 cc. deep injection
4/23		
3:00 a. m.	P. 92	Veratrum viride 10 minims hypodermically
8:00 a. m.	T. 98.6 F.; B. P. 138/93; P. 76; headache.....	Veratrum viride 5 minims hypodermically
8:30 a. m.	Drowsy, listless, vomiting	
9:30 a. m.	B. P. 124/80; P. 50	
10:00 a. m.	Taking fluids well	Magnesium sulfate (50%) 5 cc. deep injection
1:00 p. m.	Cooperative	Dextrose (10%) 750 cc. intravenously
4:00 p. m.	Headache; B. P. 138/80; P. 88	
4:05 p. m.	P. 82	Veratrum viride 5 minims hypodermically
4:20 p. m.	Vomiting	
7:00 p. m.	B. P. 120/50; P. 48.....	Magnesium sulfate (50%) 5 cc. deep injection
12:00 m.	P. 84	Veratrum viride 10 minims hypodermically
4/24		
1:30 a. m.	B. P. 136/94; P. 52; headache	
2:00 a. m.	P. 84	Veratrum viride 3 minims hypodermically
8:00 a. m.	T. 98.6 F.; B. P. 156/96; P. 52; cooperative; headache	
8:40 a. m.	P. 72	Veratrum viride 3 minims hypodermically
9:20 a. m.	B. P. 108/70; P. 48	
10:20 a. m.	.....	Cervix dilated 2 fingerbreadths; membranes stripped
11:05 a. m.	.....	Castor oil 2 ounces (60 cc.); quinine 5 grains
12:05 p. m.	.....	Quinine 5 grains
2:00 p. m.	B. P. 120/80; P. 72; headache	
3:40 p. m.	P. 72; pains every 15-20 minutes	
5:00 p. m.	B. P. 134/68; P. 48; resting quietly	
4/25		
7:45 a. m.	B. P. 168/90; P. 64; slept most of night	
8:15 a. m.	T. 98.8 F.; P. 72; headache.....	Veratrum viride 5 minims hypodermically
11:30 a. m.	.....	Braun bag extra-ovarially
2:30 p. m.	.....	Braun bag expelled
2:45 p. m.	.....	Membranes ruptured artificially
3:30 p. m.	Pains every 3 minutes	
6:20 p. m.	Bulging; to delivery room	
6:38 p. m.	.....	Delivered spontaneously, episiotomy
6:43 p. m.	.....	Pitocin 1 cc. hypodermically; placenta and membranes intact
7:00 p. m.	B. P. 136/90; P. 94.....	Ergot, 2 ounces rectally; magnesium sulfate (50%) 10 cc. deep injection
8:55 p. m.	B. P. 196/130; P. 96	Veratrum viride 5 minims hypodermically
9:20 p. m.	B. P. 136/74; P. 60; normal bleeding	
4/26		
12:45 a. m.	B. P. 170/100; P. 60; vertigo.....	Veratrum viride 5 minims hypodermically
1:00 a. m.	Vomiting	
4:30 a. m.	B. P. 168/90; P. 72; vertigo, headache	
5:00 a. m.	.....	Veratrum viride 5 minims hypodermically; magnesium sulfate (50%) 5 cc. deep injection
5:05 a. m.	.....	Dextrose (10%) 670 cc. intravenously
1:00 p. m.	B. P. 130/80; P. 68	
4:10 p. m.	B. P. 168/94; P. 84; vertigo	
4:30 p. m.	T. 98.8 F.....	Magnesium sulfate (50%) 5 cc. deep injection; veratrum viride 5 minims hypodermically
4/27		
9:00 a. m.	T. 98.6 F.; P. 104; headache.....	Veratrum viride 10 minims hypodermically
11:00 a. m.	B. P. 164/92; P. 62; albumin ++	
6:00 p. m.	P. 106	Veratrum viride 10 minims hypodermically
6:30 p. m.	.....	Magnesium sulfate (50%) 5 cc. deep injection
9:30 p. m.	P. 88; headache.....	Veratrum viride 5 minims hypodermically
4/28		
8:00 a. m.	T. 98.6 F.; P. 90.....	Veratrum viride 5 minims hypodermically
10:00 a. m.	B. P. 160/70; P. 88	
12:00 n.	P. 88	Veratrum viride 10 minims hypodermically
3:00 p. m.	P. 96	Veratrum viride 10 minims hypodermically
4:00 p. m.	.....	Magnesium sulfate (50%) 5 cc. deep injection
4/29		
9:00 a. m.	Feels much better; T. 98.6 F.; P. 96; no albumin.....	Veratrum viride 10 minims hypodermically
5:10 p. m.	B. P. 134/90; P. 36; vertigo.....	Veratrum viride 10 minims hypodermically
4/30		
9:00 a. m.	B. P. 154/98; P. 84	
5/1		
9:00 a. m.	B. P. 120/60; P. 108	
5/7		
10:00 a. m.	B. P. 112/70; P. 92	
5/14		
10:00 a. m.	B. P. 120/80; P. 108; urine normal.....	Discharged

becomes a simple physical fact and the action of veratrum viride is easily explained. Our concept of the sequence of events (as outlined in the chart at the beginning of this article) is that the products of conception produce or cause to be produced some kind of vasoconstricting agent (a "toxin") and that hypertension develops through the action of the simple physical law that if pressure is made on the compressible walls of a closed system containing fluid the pressure of the contained fluid rises. If this is true, it is no longer necessary to invoke the theory that the hypertension is a protective phenomenon, a defensive mechanism or the response of the arteriolar tree to a demand on the part of the kidneys or the brain for more pressure. According to the last mentioned theory, increasing vasoconstriction and hypertension are beneficial in the presence of toxemia and eclampsia because they tend to maintain adequate circulation; according to our concept, increasing vasoconstriction (and its inevitable companion hypertension) is detrimental, followed as it is by anoxemia, retention of waste products, edema and even necrosis.

Veratrum viride is apparently a vasodilator (Solis-Cohen and Githens,² Hare,³ Cramer⁴) and in the presence of eclampsia acts by relieving widespread vasoconstriction. Dilation of the arteriolar bed with this drug causes a more normal blood supply to become available to the tissues, and various therapeutic agents (magnesium sulfate and dextrose, for instance) have more ready access to them. A drop in blood pressure follows relaxation of the contracted arterioles as surely as a rise in pressure follows arteriolar constriction. But we emphasize that veratrum viride is not used in cases of eclampsia for the express purpose of overcoming high blood pressure, although this secondary phenomenon may be beneficial when an overtaxed heart is about ready to fail or a weakened artery to burst. We consider that the primary function of veratrum viride in eclampsia is to induce generalized vasodilatation (vasorelaxation) with a consequent improvement in arterial circulation to all parts of the body.

Table 8 gives in detail the treatment followed in a fairly typical case of antepartum eclampsia.

SUMMARY

In a series of 120 consecutive cases of eclampsia the gross mortality rate was 1.67 per cent.

The low mortality rate is attributed to the employment of a method of treatment which stresses the use of veratrum viride (a vasodilator), dehydration with dextrose and magnesium sulfate solutions, an increased fluid intake and the withholding of sedation.

Recovery from the acute stage was the criterion for determining when induction of labor should be attempted, and the simplest methods of induction were tried first. In the forty-three cases of antepartum eclampsia requiring induction of labor the average interval between apparent control of convulsions and the first attempt to induce labor was almost fifty-eight hours.

In no case did the treatment fail, and there were no deaths from eclampsia or any of its immediate complications. The two deaths which did occur were from sepsis and occurred on the fourteenth and the sixty-fifth day respectively post partum.

ABSTRACT OF DISCUSSION

DR. HENRY LYNDE WOODWARD, Cincinnati: In the ten year period covered by this report, from 1940, we have delivered 19,989 mothers in our service at the Cincinnati General Hospital, with 120 eclamptic, an incidence of 0.6 of 1 per cent. Of the 120 with eclampsia, two died of sepsis, one two weeks and the other two months after the last convulsion, an uncorrected mortality of 1.67 per cent. I can add to this series, treated in the same way and during the same period, seven private consultations, with no deaths, increasing the total to 127 cases with two deaths, an uncorrected mortality of 1.57 per cent. These figures speak for themselves. The treatment outlined in the paper is just as valuable in preventing eclampsia in the severely toxic as it is in the treatment of the patient in convulsions. Without the use of a preparation of veratrum viride many more of these patients in this large group, which included many toxic patients, would have gone on to the convulsive stage. Many of the group of 120 patients with eclampsia were emergency cases, sent to the hospital only after the convulsions developed, and many of them had no antepartum care or had inadequate care. Most of our toxic patients are sent in early from the clinics or by their physicians, and in this group convulsions are rarely allowed to occur. The induction of labor is used very conservatively, not only for the patients with eclampsia but also for the severely preeclamptic patients. It is never attempted while the nervous symptoms which precede a convulsion are present, such as headache or epigastric pain. These symptoms can be immediately controlled by the hypodermic use of the preparation of veratrum viride. It is during the lull which follows the storm that such attempts at induction are made, and only by as conservative means as possible. The point that I wish to bring out most emphatically is that this treatment cannot be standardized but must be used in each individual case according to the results obtained. The best indicators are the slowing of the pulse and the drop in the blood pressure. Both of these indicate a desirable blood vessel relaxation and need cause no alarm. Both the magnesium sulfate by deep intramuscular injection and dextrose intravenously aid in the results, but the essential feature is the action of the veratrum viride bringing about vascular relaxation, with slowing of the pulse and a drop in blood pressure, thus preventing or controlling the convulsions.

DR. J. I. HOFBAUER, Cincinnati: In the treatment of eclampsia two cardinal aspects require consideration: sedation of the midbrain by magnesium sulfate, chloral, morphine or phenobarbital and relief of vasospasm. Repeated applications of ultraviolet rays, hypertonic dextrose solution and morphine proved, both clinically and experimentally, to effect vasodilatation and to counterbalance the vasospastic effect of post-pituitary on the coronary arteries. Recently I have been employing nicotinic acid and papaverine hydrochloride, with its marked vasodilating effect, as a useful adjunct. Nature apparently provides during normal pregnancy a powerful vasodilator mechanism by storing in the placenta remarkably large amounts of acetylcholine. The immediate contact of the placenta with the maternal circulation and the well known formation of syncytial buds, which through their disintegration carry into the blood stream specific placental elements, call for consideration in this respect. Augmented thyroid activity during pregnancy with increased quantities in the blood of thyroxine and iodine accounts for a heightened responsiveness of the arterioles to vasopressin. Certain split products of proteins and disturbance of salt balance of the blood also tend to make the blood vessels more sensitive to vasopressin. Acting on the supposition of an integrating mechanism concerned with maintaining during pregnancy normal calibers of the arterioles, I had recently the acetylcholine content of placentas obtained from six patients with pronounced preeclampsia determined. The comparatively low figures obtained in five instances seemed to point to a placental disorder, possibly correlated with the occurrence of placental infarcts and autolysis in the late toxemia of pregnancy. If verified and corroborated by further data, the new aspect of placental deficiency in storing acetylcholine, offered as it is with all due reserve, may help in clarifying the perplexity of the origin of eclampsia. If the view is acceptable that eclampsia actually represents the manifestation of height-

2. Solis-Cohen, Solomon, and Githens, T. S.: *Pharmacotherapeutics*, New York, D. Appleton-Century Company, 1928, p. 1321.

3. Hare, H. A.: *Textbook of Practical Therapeutics*, ed. 20, Philadelphia, Lea & Febiger, 1927, p. 555.

4. Cramer, William: *J. Pharmacol. & Exper. Therap.* 7: 62, 1915.

ened functional activity of the hypothalamus with outbursts of somatic and sympathetic activity through mediation of the hypophysis, an explanation would readily present itself for the increase of gonadotropic hormones in the blood, the seasonal variations and the occurrence of hemorrhagic lesions in the gastrointestinal tract in preeclampsia and eclampsia.

DR. RICHARD D. BRYANT, Cincinnati: Dr. Hofbauer has possibly thrown a little light on that place that we had marked in our chart as "toxin" in quotation marks, admitting that we didn't know what it is. His discussion is very interesting.

CANCER OF THE LARYNX

RELATION BETWEEN GROSS ANATOMY, MICROSCOPIC STRUCTURE AND RADIOSENSITIVITY

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CHICAGO

A marked difference of opinion exists as to the relationship between microscopic structure and radiosensitivity. This fact complicates the management of many forms of cancer, especially those in which a decision between surgery and irradiation has to be made. My purpose in this communication is to discuss the clinical and pathologic factors related to radiosensitivity of cancer of the larynx, with special emphasis on the value of biopsy in estimating the prognosis and guiding the treatment. This communication is based on a study of approximately 300 cases of cancer of the larynx observed during the last ten years.

Before the advent of irradiation in the treatment of cancer of the larynx, surgeons recognized a relation between their surgical results and the histologic structure of the lesions. This clinical experience and Broders' ¹ microscopic studies in the grading of cancer led to the view that in general the highly differentiated forms of carcinoma of the larynx (grades 1 and 2, Broders) yielded the best results, whereas the most undifferentiated forms (grades 3 and 4, Broders) yielded the worst results.²

With the advent and development of irradiation, the radiotherapists were soon impressed with the marked differences in radiosensitivity and radiocurability of different forms of cancer of the larynx, and numerous efforts have been made to correlate histologic structure with radiosensitivity and radiocurability. On the results of these studies there is considerable divergence of opinion, and since the microscopic appearances found at biopsy are used by many in deciding between the major procedures of laryngectomy and irradiation in certain cases, the practical importance of this problem is at once obvious.

The literature on this subject contains numerous general discussions but few comprehensive studies. The view that the histologic structure of the biopsy is of

practical value in helping to choose between surgery and irradiation in intrinsic cancer of the larynx is expressed by Gordon New and is based on the clinical and pathologic experience of New and Broders. A similar view is held by the Jacksons and is based on their experience in collaboration with the microscopic studies of Konzelmann.³

Other expressions on this subject may be summarized as follows: Lenz, Coakley and Stout ⁴ state that keratinized carcinomas of the larynx are radioresistant. Schinz and Zuppinger,⁵ however, have reported favorable results of irradiation in twenty-five cases of adult hornifying carcinoma of the larynx. Vogel⁶ states that the histologic differentiation between radiosensitive and radioresistant carcinomas is impossible. The view that the histologic structure is of minor importance and is of limited value in estimating radiosensitivity and determining the type of treatment in laryngeal cancer is shared by Adam,⁷ Kriegsmann,⁸ Quick,⁹ and Harris and Klemperer.¹⁰

DEFINITION OF RADIOSENSITIVITY

The most satisfactory definition of a radiosensitive tumor is that it is one which can be completely sterilized without permanent damage to the surrounding normal

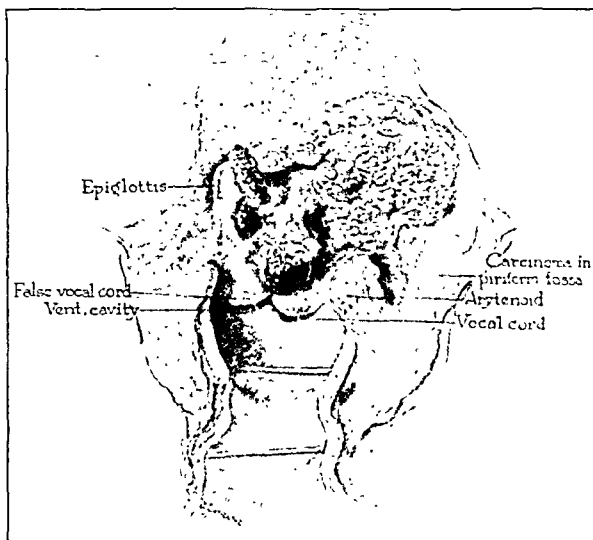


Fig. 1 (case 1).—Carcinoma of the laryngeal vestibule indicating the tendency of these tumors to remain confined to the superior portion of the larynx. In this specimen the carcinoma has respected the ventricular cavity and vocal cord but has invaded the piriform fossa and has destroyed part of the epiglottis. (Courtesy of Dr. Otto Saphir.)

tissues. Since the property of radiosensitivity is a matter of degree and is so intimately related to the efficiency of the treatment, it is impossible to draw a fine line of division between "radiosensitive" and "radioresistant" tumors.

Owing to lack of space, this article has been abbreviated for publication in *THE JOURNAL*. The complete article appears in the author's reprints.

Read before the Section on Pathology and Physiology at the Ninety-First Annual Session of the American Medical Association, New York, May 13, 1940.

The administration and staff of the U. S. Veterans Facility, Hines, Ill., gave their cooperation to the author in this work and Dr. Henri Coutard collaborated with him in problems relating to roentgen therapy.

1. Broders, A. C.: Squamous Cell Carcinoma of the Lip, *J. A. M. A.* 74: 656 (March 6) 1920.

2. New, G. B., and Waugh, J. M.: The Curability of Carcinoma of the Larynx, *Surg., Gynec. & Obst.* 58: 841 (May) 1934. Jackson, Chevalier, and Jackson, C. L.: *Cancer of the Larynx*, Philadelphia, W. B. Saunders Company, 1939. Negus, V. E., in discussion, *Tr. Am. Laryng. A.* 60: 82, 1938.

3. Konzelmann, quoted by Jackson.²

4. Lenz, Maurice; Coakley, C. G., and Stout, A. P.: Roentgenotherapy of Epitheliomas of the Pharynx and Larynx, *Am. J. Roentgenol.* 32: 500 (Oct.) 1934.

5. Schinz, H. R., and Zuppinger, A.: Sierzehn Jahre Strahlentherapie der Krebse, Leipzig, Georg Thieme, 1937.

6. Vogel, Klaus: Die Strahlenbehandlung des Kehlkopfcarcinoms, *Ztschr. f. Hals-, Nasen- u. Ohrenh.* 40: 172 (Aug. 12) 1936.

7. Adam, A.: Technik und Methodik der Strahlenbehandlung des Larynx-Carcinoms, *Ztschr. f. Hals-, Nasen- u. Ohrenh.* 40: 192 (Aug. 12) 1936.

8. Kriegsmann: Demonstration von röntgenbestrahlten Kehlkopfkarcinomen, *Hals-, Nasen- u. Ohrenarzt* (part 2) 44: 242 (May 15) 1937.

9. Quick, Douglas: Carcinoma of the Larynx, *Am. J. Roentgenol.* 35: 821 (Dec.) 1937.

10. Harris, William, and Klemperer, Paul: Pathologic Differentiation Between Radiosensitive and Nonradiosensitive Malignant Neoplasms of the Larynx, *Arch. Otolaryng.* 28: 355 (Sept.) 1938.

CLINICAL-PATHOLOGIC CLASSIFICATION¹¹

The classification presented here embodies the principle of histogenesis, which seems to be an important factor in both the surgical and the radiation treatment of the disease.

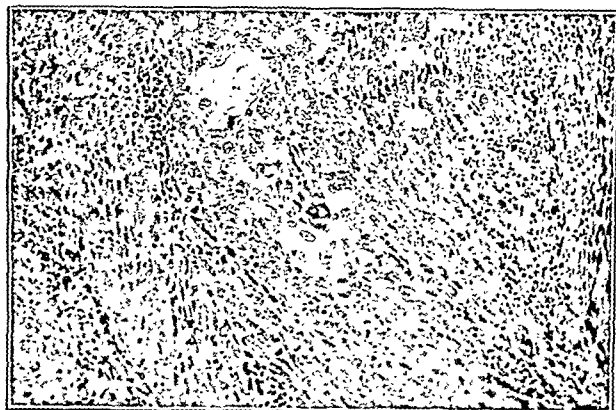


Fig. 2 (case 1).—Section showing undifferentiated epidermoid carcinoma (grade 3-4). Note attempts at pearl formation.

Because of the confusion that exists in the surgical, laryngoscopic and radiologic literature in the use of the terms extrinsic and intrinsic cancer of the larynx, and since the so-called extrinsic forms are actually pharyngeal tumors, it seems best to classify carcinoma of the larynx with reference to the site of the origin of the tumor and not with reference to its extension. According to this conception, therefore, cancer of the larynx may be divided into four types: (1) laryngeal vestibule



Fig. 3 (case 1).—Epidermis following telecurietherapy.

(epiglottis, false cord), (2) ventricular cavity, (3) vocal cord, (4) subglottic area.¹²

Carcinoma of the Laryngeal Vestibule.—This group includes two subvarieties: (1) carcinoma of the free border and laryngeal surface of the epiglottis and (2) carcinoma of the false

cord. The two varieties are discussed under the general term vestibular carcinoma, because they are almost always involved together.

1. Carcinoma of the free border and the laryngeal surface of the epiglottis generally produces a bulky ulcerated tumor which may grow to fill the entire laryngeal vestibule. The epiglottis itself may be partially destroyed. Anterior extension may result in tumefaction of the soft parts between the hyoid bone and the superior border of the thyroid cartilage. A second form of epiglottic carcinoma appears as a smooth rounded dome-like swelling of the laryngeal surface of the epiglottis projecting into the vestibule. Ulceration may not be visible until late. A third type of epiglottic carcinoma arises from the free border of the epiglottis and spreads anteriorly into the vallecula.

2. Carcinoma arising from the false cord tends to remain confined to the supraglottic region. Extension to the preepiglottic space is common. Extension to the true vocal cords results in intermittent hoarseness. This may be the first symptom that brings the patient in for examination. Dyspnea is the most common clinical symptom. Pain is generally absent in the early stages. Difficulty in swallowing arises when the tumor has extended posteriorly to the pyriform fossa.

Carcinoma of the laryngeal vestibule has a tendency to grow rapidly and extend widely both by direct invasion and by lymphatic spread. This form is generally composed of undifferentiated cells with a high degree of radiosensitivity and is best treated by external irradiation. In spite of its wide invasion

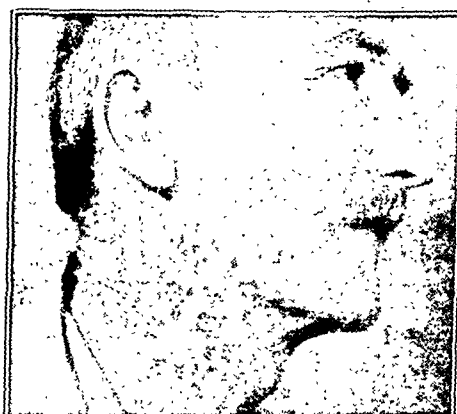


Fig. 4 (case 1).—Appearance of patient seven years after treatment.

and lymphatic spread, it is sometimes cured by external irradiation. Especially favorable is carcinoma arising from the epiglottis even though it may be associated with metastasis to the lymph nodes. By virtue of its location, histologic type and diffuse bilateral invasion, it is outside the domain of surgery.

CASE 1.¹³—G. E. (figs. 1, 2, 3 and 4), a man aged 58, had an extensive papillary ulcerated lesion of the epiglottis and left pyriform sinus. There were metastases to the lymph nodes in the left upper cervical area. Biopsy revealed an undifferentiated epidermoid carcinoma. Telecurietherapy was given from July 20 to Sept. 8, 1933. The patient has been well and free from disease for seven years.

This is an example of a very extensive cauliflower vestibular carcinoma involving the epiglottis and extending to the pyriform fossa with metastasis to the left cervical lymph nodes. The histologic structure (fig. 2) shows a completely undifferentiated epidermoid carcinoma (transitional cell type). The site of origin, clinical features and microscopic structure combine to form a classic example of a highly radiosensitive carcinoma of the laryngeal vestibule. The property of radiosensitivity may be predicted from this microscopic picture with reasonable accuracy.

Carcinoma Arising in the Ventricular Cavity.—These tumors grow silently within the ventricular cavity without producing symptoms or signs over long periods. A sudden attack of dysp-

11. Classification according to Cutler, Max, and Buschke, Franz: *Cancer. Its Diagnosis and Treatment*, Philadelphia, W. B. Saunders Company, 1938.

12. A discussion of subglottic carcinoma is omitted here because of lack of space.

13. This case was reported in 1934 (Cutler, Max: *The Problem of Radiosensitivity*, J. A. M. A. 103:1204 [Oct. 20] 1934).

nea may be the first indication of disease. Laryngeal examination may disclose only a smooth elevation of the ventricular band without ulceration. When the lesion projects into the laryngeal lumen, biopsy may be made from the papillary projections without difficulty; however, when the tumor does not project into the laryngeal lumen biopsy is exceedingly difficult and often gives repeatedly negative results. The cells are generally undifferentiated, with a tendency to widespread invasion.

CASE 2.—M. S. (figs. 5, 6, 7 and 8), a man aged 57, had swelling and tenderness of the skin and subcutaneous tissues overlying the thyroid and cricoid cartilages anteriorly in the midline. An ulcerated lesion of the right false cord extended downward to the subglottic region. There was diminished mobility of the right hemilarynx. Cervical adenopathy was not present. Extensive destruction of the thyroid cartilage was present with impending perforation through the skin anteriorly. Roentgen therapy was given from July 7 to July 30, 1938, resulting in complete disappearance of the lesion. The patient has been well and free from disease for two years. A biopsy revealed an undifferentiated epidermoid carcinoma.

This is a classic example of an undifferentiated epidermoid carcinoma originating in the ventricular cavity, extending to the preepiglott-



Figure 5

Figure 6

Fig. 5 (case 2).—Swelling over region of thyroid cartilage before treatment, indicating extension of ventricular carcinoma through thyroid cartilage.

Fig. 6 (case 2).—Appearance of patient in May 1940, two years after x-ray therapy.

tic space, destroying parts of the thyroid and cricoid cartilages and extending to the cutaneous and subcutaneous tissues of the anterior surface of the neck. The high degree of radiosensitivity of tumors of this type accounts for their response to adequate irradiation in spite of the fact that their great extent includes the destruction of cartilage. X-ray examination of the soft tissue of the larynx before and after treatment discloses remarkable repair of the cartilage.

Carcinoma of the True Vocal Cord.—This type composes the vast majority (from 80 to 90 per cent) of endolaryngeal tumors. The lesion begins in the midportion of the free border of the true cord and extends anteriorly. Further extension anteriorly occurs either in the form of a thin layer of carcinoma extending along the superior and free borders of the cord or by an ulcerated destructive invasion of the cord itself. Extension then occurs to the anterior commissure and across the midline to the opposite cord. Early hoarseness is the most prominent clinical symptom. The clinical course is slow. Immobility of the cord constitutes a most important diagnostic and prognostic sign.

CASE 3.—M. G. (figs. 9 and 12), a man aged 43, had an ulcerated lesion involving the anterior two thirds of the right true cord extending to the anterior commissure. Both cords were freely movable. A biopsy revealed an adult hornifying squamous carcinoma. Treatment consisted of telecurietherapy from April 30 to June 6, 1933, resulting in complete disappearance of the lesion.

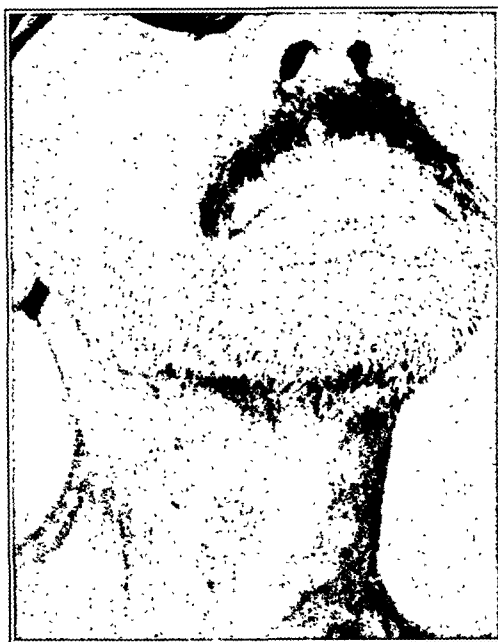


Fig. 7 (case 2).—Epidermite in 1938 following x-ray therapy.

ance of the lesion. Fifteen months after the completion of the treatment superficial leukoplakia developed at the site of the previous tumor. This lesion remained unchanged for four years, after which slight thickening was suspected and a laryngofissure was performed. Evidence of carcinoma was not found. The patient was free from disease for seven years and two months after irradiation.¹⁴

CASE 4.—O. M. (fig. 10), a man aged 73, had an ulcerated lesion of the anterior two thirds of the right true cord extending onto and crossing the anterior commissure and involving the anterior third of the left true cord. Both cords were freely movable. There was no fixation of the arytenoids. A biopsy revealed a papillary squamous carcinoma. Telecurietherapy was

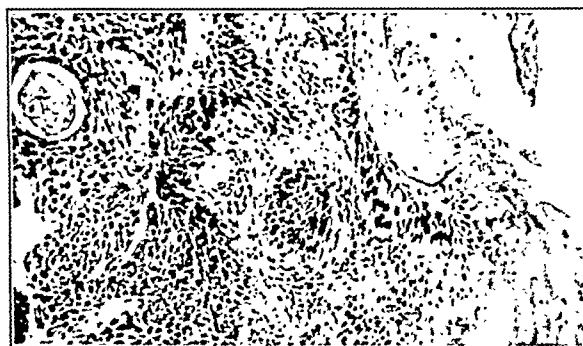


Fig. 8 (case 2).—Section showing undifferentiated epidermoid carcinoma (grade 3-4); radiosensitive in spite of pearl formation.

given from Feb. 21 to April 11, 1935, resulting in complete disappearance of the lesion. The patient has been well and free from disease for five years and four months.

CASE 5.—R. W. (fig. 11), a man aged 47, had an ulcerated lesion of the anterior three fourths of the right true cord extending forward to the anterior commissure and posteriorly to and

14. It is now obvious that the laryngofissure might have been avoided in this case.

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including the right arytenoid, with partial fixation of the right cord. The left cord was freely movable. There was some suggestion of subglottic extension. A biopsy revealed an adult hornifying squamous carcinoma with pearl formation. Roentgen therapy was given from July 2 to Aug. 26, 1936, resulting in complete disappearance of the lesion. The patient was well and free from disease for almost four years (June 1940).

Cases 3, 4 and 5 illustrate different stages of carcinoma of the true cord. In case 3 the lesion of the left cord had reached the anterior commissure (fig. 9). In case 4 it had crossed the anterior commissure and involved the opposite cord (fig. 10). The cords and arytenoids were freely movable in both cases and there was no clinical evidence of subglottic disease in either case. Both lesions were amenable to laryngofissure by Jackson's anterior commissure technic.

In case 5 the lesion had involved the entire right cord and anterior commissure and reached the right arytenoid, which was enlarged and slightly fixed (fig. 11). There was some evidence of subglottic extension. The extent of the disease, including involvement of the arytenoid, would have necessitated total laryngectomy.

The specimens taken for biopsy in all three cases showed adult hornifying squamous carcinoma, in spite of which the carcinoma disappeared completely under external irradiation and the patients have remained well and free from disease for seven

Under these circumstances it is impossible from clinical examination alone to know whether the lesion originated in the true cord or the false cord, yet this decision is most important because a fixed true cord lesion of this extent is generally incurable by irradiation and curable by laryngectomy, whereas a fixed lesion originating in the false cord is generally curable by irradiation and incurable by surgery. The surprising feature in this case is that in spite of the extent of the disease and apparent fixation of the hemilarynx the patient has been well and free from disease for almost six years. This result was first thought to be due to the more effective irradiation administered. This may be true; however, these studies raise the question whether the good results may not be explained by the site of origin in the false cord.

The accompanying table shows forty-five cases of cancer of the larynx in which treatment in twenty-five was by x-rays and in twenty by radium (telecurietherapy). Twenty-seven patients were well from one to two years and seventeen were well from three to seven years after treatment. The table is not presented as a statistical analysis of curability; a complete statistical study with ultimate results of treatment in the entire group of 300 carcinomas of the larynx is in preparation and will be published in the near future.

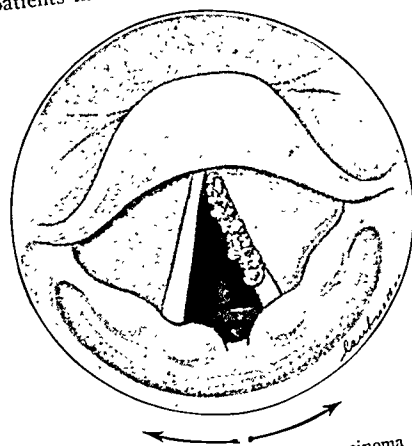


Fig. 9 (case 3).—Squamous carcinoma involving anterior three fourths of the left true cord, extending to the anterior commissure; cord freely movable.

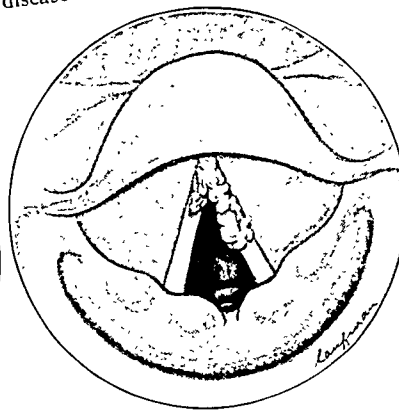


Fig. 10 (case 4).—Squamous carcinoma involving the left true cord, extending across the anterior commissure, involving the right cord; both cords freely movable.

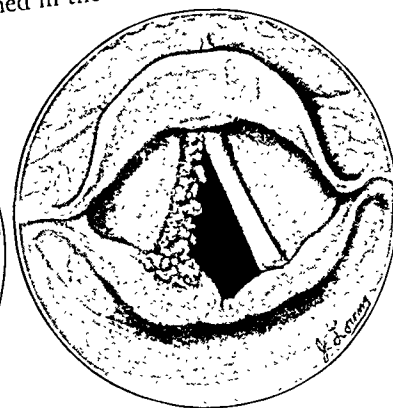


Fig. 11 (case 5).—Squamous carcinoma involving the right true cord, anterior commissure, right arytenoid and slight subglottic region with partial fixation.

years, six years and almost four years respectively. These three cases illustrate intrinsic carcinoma of the larynx treated by external irradiation for various reasons. Some patients whose lesions have been so extensive as to require laryngectomy have refused the radical operation. In some, the age or general condition contraindicated surgery. In still others irradiation was used as a therapeutic test and continued when the lesion proved to be radiosensitive.

There have been several cases of rather advanced carcinoma of the larynx involving both true and false cords with apparently complete fixation of the hemilarynx in which the lesion has disappeared completely following intensive external irradiation. It is interesting to analyze the possible reasons for this unexpected result. The following case is an example:

CASE 6.—W. M. (fig. 14), a man aged 58, had an extensive ulcerated lesion involving the entire left true and false cords. There were edema and fixation of the left arytenoid, definite subglottic extension and fixation of the left hemilarynx. Adenopathy was not present. Telecurietherapy was given from Sept. 24 to Nov. 12, 1934, resulting in complete disappearance of the lesion. The patient has been well and free from disease for five years and seven months.¹⁵

This is an example of an intrinsic carcinoma of the larynx involving the true and false cords with extension upward to the base of the epiglottis and downward to the subglottic region.

15. An independent carcinoma of the mucous membrane of the left cheek developed in November 1939; it was treated with telecurietherapy and has disappeared.

The forty-five cases included in this table were selected as representing radiosensitive and not necessarily radiocurable lesions. Attention is called to the following interesting features in the table: Twenty-two patients (50 per cent) had advanced lesions, inoperable technically and biologically. The histologic structure in group A is almost without exception the undifferentiated, transitional cell type (Broders' grades 3 and 4). The uniform relation between the site of origin (epiglottis, false cord and ventricle) and the microscopic features is striking.

Twenty-three patients with operable cancers of the larynx (group C) are well and free from disease (fifteen from one to two years and eight from three to seven years). Here is found a remarkably uniform relation between site of origin and histologic structure. In most cases biopsy revealed adult hornifying squamous carcinoma with pearl formation; in some it showed papillary plexiform epidermoid carcinoma.¹⁶ This group has a special significance in disproving the repeated statements in the literature that adult squamous carcinoma is radioresistant. The radiosensitivity in this group is accounted for by the fact that all the lesions

16. The absence of undifferentiated cellular elements distinguishes the histologic structure of this group from that found in group A, in which foci of adult features with pearl formation are often encountered.

were movable, indicating that true invasion of surrounding structures had not occurred. The radiocurability of many of the lesions is explained by their noninfiltrating character and the adequacy of the irradiation.

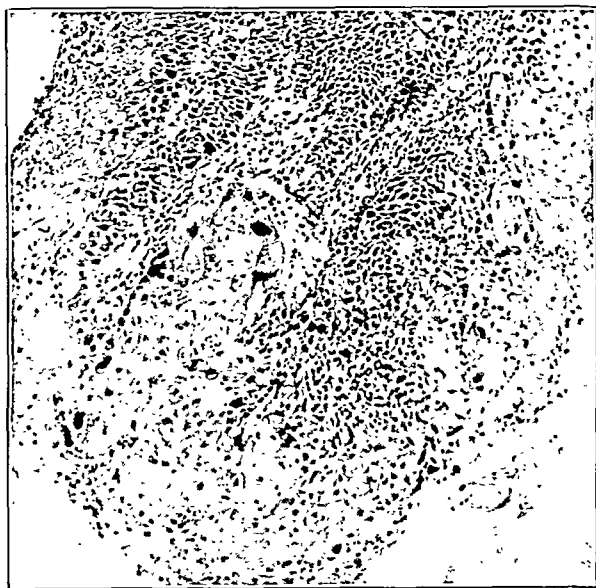


Fig. 12 (case 3).—Adult hornifying squamous carcinoma of the true cord (grades 1 and 2).

The six cases classified under "true and false cord, origin undetermined" (group B) present a uniform microscopic structure (fig. 14). It is best described as a papillary plexiform epidermoid carcinoma. All the lesions responded favorably in spite of their advanced stage and apparent fixation; consequently they are radiosensitive. It is my definite impression that lesions

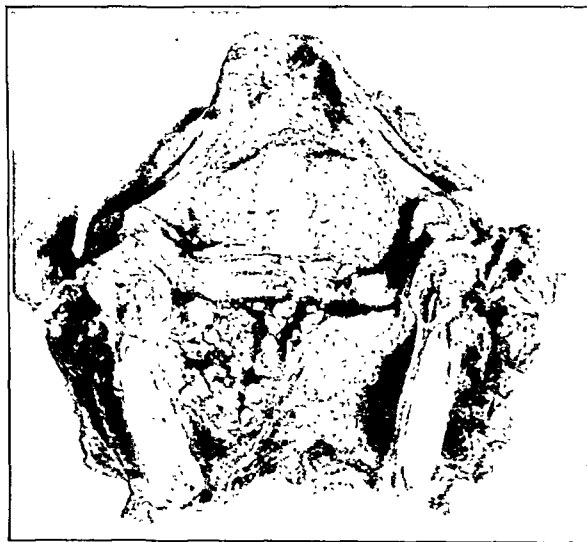


Fig. 13.—Squamous carcinoma of the right true cord with subglottic extension and complete fixation; incurable by external irradiation.

of this histologic type are accompanied by a favorable prognosis. I suspect that their good prognosis is due to their papillary structure. It is not certain whether their origin is in the true cord or in the false cord, but it is probable that these lesions may arise in either cord. This group requires further study.

COMMENT

The microscopic structure of a biopsy specimen of cancer of the larynx is of some help in estimating the prognosis and in guiding treatment. Its value is, however, distinctly limited and unless the microscopic changes are interpreted in the light of the clinical and gross anatomic factors the biopsy alone may be highly misleading.

It is generally recognized that the specimen taken for biopsy may not be representative of the actual lesion. This error can be diminished by taking specimens for biopsy from different portions of the lesion. When biopsy discloses a highly undifferentiated carcinoma it may be assumed that the lesion is of this type. The contrary is not true.

The presence in epidermoid carcinoma of the larynx of adult differentiated morphologic features such as marked hornification and pearl formation in the absence of undifferentiated cellular elements does not, as is generally supposed, necessarily indicate radioresistance. It is fully established from this and other studies that when these microscopic features occur in a lesion which is papillary and movable and has not invaded the underlying structures it may be eradicated and cured by cor-

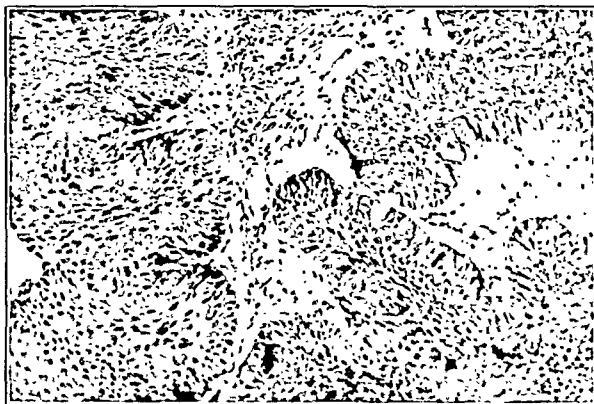


Fig. 14 (case 6).—Papillary plexiform epidermoid carcinoma; lesions of the structure generally radiosensitive.

rect external irradiation without permanent damage to the normal tissues.

If the biopsy shows a highly undifferentiated carcinoma, the radiosensitivity of the lesion may be predicted with reasonable certainty but its radiocurability is dependent on the extent of the disease, general condition of the patient, efficiency of the treatment and other factors of a biologic nature which are not understood.

If biopsy shows a highly undifferentiated carcinoma interspersed with differentiated elements in the form of foci of adult hornifying squamous areas and pearl formation, the latter are not significant (figs. 2 and 8). This is proved by the marked radiosensitivity and curability of a group of advanced lesions in which the biopsy showed these microscopic features.

There is some evidence to indicate that a papillary plexiform structure (fig. 14) is a favorable sign in the prognosis. Further observations are under way in an effort to determine this point.

The site of origin of a carcinoma of the larynx is one of the most important factors related to prognosis and treatment. Carcinoma arising in the false cords and epiglottis is generally undifferentiated and radiosensitive. Carcinoma arising in the true cord is generally differentiated, its radiosensitivity depending on the presence or absence of invasion.

Mobility of the lesion and the surrounding structures is a most important clinical sign. Complete mobility is highly favorable and with rare exceptions indicates radiosensitivity and under special conditions radiocurability. Fixation is usually due to neoplastic invasion, but it may be due to secondary infection and inflammation. Partial fixation frequently observed after biopsy is due to these factors and should be interpreted accordingly. Undifferentiated carcinomas usually remain movable in spite of their large size, and they may be recognized by this clinical fact, whereas a small infiltrating differentiated carcinoma may cause complete fixation of the cord when the lesion is quite limited in extent. The prognosis of the former is comparatively favorable under irradiation, in spite of its great extent and even of regional metastases, whereas the prognosis of the latter under irradiation is most unfavorable in spite of the fact that the lesion is very small and limited in extent. Conversely, the bulky undifferentiated carcinoma (grades 3 and 4) is totally unsuitable for surgery,

are more consistent and until more time has elapsed in order that the permanence of the irradiation cures may be more fully established. In the meantime, the newer technic can be utilized effectively in the treatment of inoperable laryngeal cancer and under circumstances in which operation is contraindicated or refused.

SUMMARY

The main result of this investigation is the demonstration that the radiosensitivity of cancer of the larynx cannot be determined on the basis of microscopic structure alone. The most important indication of radiosensitivity is mobility of the lesion and surrounding structures.

430 North Michigan Avenue.

ABSTRACT OF DISCUSSION

DR. CHEVALIER JACKSON JR., Philadelphia: I am essentially in agreement with Dr. Cutler's views as presented in this paper. It is our practice at Temple University Hospital to be guided first of all by the location of the lesion in the selection of treatment. We do consider the histologic aspect also. Biopsies are done in every case, and occasionally more than one biopsy. But it is in the borderline cases that we take into consideration the histologic features. For example, it is our present practice still to do laryngofissure when there are cordal lesions not reaching the posterior end of the cord and not fixed or markedly impaired in motion. In a series of ninety cordal cases reviewed recently there were fifteen of grade 1, thirty-nine of grade 2, sixteen of grade 3 and seven of grade 4. Yet in all those cases laryngofissure was done. I mention these figures just to show that we do not feel that a so-called high grade or undifferentiated tumor is necessarily a contraindication to surgery. Conversely, we do not believe either that the well differentiated tumor, the so-called radioresistant tumor, is one in which irradiation may not obtain excellent results. We are inclined to believe that the best prognosis in cancer of the larynx, regardless of the method of treatment, is probably obtained in the better differentiated tumors. In the so-called radiosensitive tumors, we have had the same experience as Dr. Cutler. They are not necessarily the more radiocurable ones. In one series of eighteen cases in which five years has elapsed, there were twelve intrinsic and six extrinsic cases; of the intrinsic cases, seven have been free from the disease five years or longer, and of the six extrinsic cases only one is known to be free from the disease. In this series the grading is of particular interest. Of the grade 1 cases in this series of eighteen two are among those showing no evidence of disease at the present time. Of the grade 2 cases, three show no evidence of disease. In the grade 3 cases there are no survivals. Of the grade 4 cases there are two which show no evidence of disease at the present time, one of those being a ventricular band lesion and the other a lesion of the aryepiglottic fold. Perhaps both of these would be considered vestibular, according to Dr. Cutler's classification. Dr. Cutler asked me to express an opinion on the slide that he showed representing a lesion involving the entire length of the cord. In that case we would consider laryngofissure entirely contraindicated, since there is impairment of motion. We would do a laryngectomy, I believe, if the patient was willing and there were no contraindications.

DR. FRANK W. KONZELMANN, Philadelphia: I endorse everything that Dr. Cutler has said. I am glad that he has emphasized the importance of distinguishing between radiosensitivity and radiocurability. Edward Chamberlain, at Temple, has taught us the importance of distinguishing those two conditions and that one doesn't necessarily follow the other. I believe with Dr. Cutler too, and it has been our experience in about 500 cases, that grading should not be the sole guide to treatment and prognosis. The extent of the lesion and the fixation of tissues are just as important. We grade all our tumors as a matter of record, but we try not to place too much importance on the degree of differentiation or the lack of differentiation. I should like to ask Dr. Cutler why he called the first slide he

*Forty-Five Patients with Cancer of the Larynx Treated by External Irradiation Well and Free from Disease, from One to Seven Years, Showing Relation Between Site of Origin, Histologic Structure and Radiosensitivity**

Clinical Type	Stage of Disease	Histologic Structure	Number Years Free from Disease							Total Cases
			1	2	3	4	5	6	7	
A. Vestibule (epiglottis, false cord)	Advanced, inoperable, "extrinsic"	Undifferentiated transitional cell epidermoid carcinoma (grades 3 and 4)	3	7	1	2	.	2	1	16
Ventricle										
B. True cord and false cord (precise origin undetermined)	Advanced, "intrinsic"	Papillary plexiform epidermoid carcinoma	.	2	2	.	.	1	1	6
C. True cord	(a) 8 cases (b) 8 cases (c) 3 cases (d) 4 cases	Adult differentiated squamous carcinoma, and papillary plexiform epidermoid carcinoma (grades 1 and 2)	7	8	3	2	1	.	2	23
Total			10	17	6	4	1	3	4	45

* Two patients not included in this table had subglottic recurrences in spite of adequate irradiation for lesions of the true cord, with apparently complete mobility. These cases will be included in the table of curability in a forthcoming statistical analysis of the entire group of laryngeal cancers.

† (a) Anterior two thirds of cord involved, anterior commissure free. (b) Anterior commissure involved with or without involvement of opposite cord. (c) Whole cord involved, lesion extending to anterior commissure and arytenoid. (d) Involvement of one or both cords with subglottic extension.

and the small invasive carcinoma (grades 1 and 2) is frequently curable by surgery.

The decision between surgery and irradiation in the borderline group of laryngeal cancers is frequently difficult and a matter of clinical judgment aided by the microscopic examination. The most important clinical factors are the site of origin and the extent of disease. With increasing experience, the indications and limitations of surgery and irradiation become more clearly defined and the borderline group diminishes.

The substitution of irradiation for surgery in strictly operable cancer of the larynx entails serious responsibilities. A radiation failure often precludes a surgical cure. The careful exploration of new radiation methods in specially organized clinics under controlled conditions is the only safe method of advancing our knowledge and, in fact, is leading to encouraging progress. The general application of these newly developed methods, however, must be postponed until the results

showed a papillary carcinoma. I have been much interested in the papillomas of the larynx, especially those that occur in the older individuals. Many times they have shown such a degree of lack of differentiation that we have been tempted to call them carcinoma, but none of these have shown any infiltrative tendencies. The first lantern slide was somewhat of an example of that type of case. I saw in the slide no evidence of invasion. We are tempted sometimes to be guided by changes in the epithelium above the basement membrane. In the case of papilloma I do not believe we have found a single case that has changed into the malignant type of lesion. Most of them respond well to superficial removal of the papillary growth without either irradiation or further extensive surgery. That carcinomas do occur and have a papillary tendency is beyond question, and we have called those, as Dr. Cutler's second slide represented, papillary carcinoma.

DR. MAX CUTLER, Chicago: I thank Dr. Jackson and Dr. Konzelmann for their courtesy in coming to discuss my paper. The photomicrograph to which Dr. Konzelmann refers was perhaps not clear but the biopsy showed definite papillary carcinoma on microscopic examination and the clinical picture was clearly that of a malignant lesion. Every effort should be made to correct the fallacy in the literature that highly differentiated adult squamous carcinoma with hornification and pearl formation necessarily indicates that the lesion is radioresistant. Such reports by pathologists often form the basis of decisions on major clinical procedures which are entirely erroneous.

CHEMOTHERAPY IN NONSPECIFIC INFECTIONS OF THE URINARY TRACT

PRESENT STATUS

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During the last ten years there has been remarkable advancement in diagnostic and operative procedures in urology. Revolutionary changes in the treatment of infections of the urinary tract now command our attention. Ten years ago the urologist was content to treat these infections expectantly or by administering drugs now believed to be of questionable efficacy. Intravenous neoarsphenamine in the treatment of coccic infection was perhaps the only specific drug therapy. In 1932 the ketogenic diet with the discovery of the bactericidal action of oxybutyric acid was the first step toward specific therapy in bacillus infections. However, many patients could not tolerate this unappetizing, nauseating diet. The following year specific bacteriophage was tried, but this met with very little success. In 1936 the first specific drug therapy, mandelic acid, was instituted in the treatment of infections of the urinary tract. It is bactericidal for most infections with *Streptococcus faecalis* and from 75 to 80 per cent of colon bacillus infections. *Staphylococcus*, *streptococcus* and *proteus* infections are rarely affected. In 1935 Temming, Klein, Pernice and their associates in Germany suggested azosulfamide (introduced as "prontosil") for colon bacillus infections. Two years later in this country

Helmholz,¹ Osterberg, Buchtel and Cook,² Herrold³ and in England Kenny⁴ showed in vitro the bactericidal power of urine after the administration of sulfanilamide and also the effect of the clinical application of sulfanilamide in infections of the urinary tract. This drug was particularly effective in colon, *proteus*, *streptococci* and *gonococci* infections and of little use in *Streptococcus faecalis* and *staphylococci* infections. Now for the first time there are available specific drugs, sulfanilamide, sulfanilyl sulfanilamide, sulfapyridine, sulfathiazole and mandelic acid for specific treatment of bacterial infections in the urinary tract.

ACTION

In spite of many theories on the action of the sulfonamide drugs they still remain a mystery. McIntosh and Whitby⁵ suggest that they may act directly as a bactericide or by preventing the invasive or multiplying power of bacteria. They may stimulate the nonspecific or specific body defenses or neutralize the toxic bacterial products. The quality or quantity of specific immune bodies, however, is not affected. There is no increase in phagocytosis, and the presence of peptone inhibits their action. They feel that the drug does not act as a simple germicide but more likely neutralizes some metabolic function or enzymatic activity that blocks the vital food supply of the bacteria. Others believe that it acts directly on the organism and that phagocytosis does play a part. Lockwood⁶ says that in the presence of traumatized or necrotic tissue sulfanilamide fails to sterilize a localized infection; it may alter the total metabolism of the organism or interfere with some specific function such as the capacity to digest protein. Long⁷ suggests that in infections of the urinary tract it may decrease the multiplication of bacteria and thereby diminish the production of toxins. There is also a definite sterilizing effect on the urine. We believe that in infections of the urinary tract the tissue reaction plays a greater part than direct bactericidal action.

PHARMACOLOGY

In man we⁸ have shown that after administration the sulfonamides are excreted in the urine with variations attributable to their different solubilities, and the excretion curves parallel the blood concentration curves (chart 1). This is not true, however, when renal function is diminished; here the blood concentration is higher and the excretion lower (chart 2). We⁸ have shown also that a standardization of dosage according to the phenolsulfonphthalein excreted in the first half hour gives a constant blood level even when there is a wide variation in renal function. In unilateral kidney disease it is evident (chart 3) that the excretion of the drug is exactly proportional to the excretion of phenolsulfonphthalein. In this particular case the good kidney with a normal phenolsulfonphthalein curve excreted 852 mg. in seven hours and the poor kidney

1. Helmholz, H. F.: Comparison of Mandelic Acid and Sulfanilamide as Urinary Antiseptics, *J. A. M. A.* 109:1039 (Sept. 25) 1937; footnote 11.

2. Buchtel, H. A., and Cook, E. N.: Use of Sulfanilamide in Treatment of Urinary Infections, *Proc. Staff Meet., Mayo Clin.* 12:444 (July 14) 1937.

3. Herrold, R. D.: Treatment of Gonorrhea and Other Infections in the Urinary Tract, *Urol. & Cutan. Rev.* 41:468 (July) 1937.

4. Kenny, Méave; Johnston, F. D.; von Haeberli, T., and Miles, A. A.: P-Aminobenzenesulfonamide in Treatment of *B. Coli* Infections of Urinary Tract, *Lancet* 2:119 (July 17) 1937.

5. McIntosh, J., and Whitby, L. E. H.: Mode of Action of Drugs of Sulfonamide Group, *Lancet* 1:431 (Feb. 25) 1939.

6. Lockwood, J. S.: Studies on the Mechanism of Action of Sulfanilamide, *J. A. M. A.* 111:2259 (Dec. 17) 1938.

7. Long, P. H., and Bliss, Eleanor A.: Observations on the Modes of Action and the Clinical Use of Sulfanilamide in Urinary Tract Infections, *South. M. J.* 31:308 (March) 1938.

8. Alyea, E. P.; Daniel, W. E., and Yates, Anne: Sulfanilamide and Disulfanilamide Concentration in the Blood and Urine, *J. Urol.* 41:14 (Jan.) 1939.

The sulfathiazole used in this study was obtained through the Winthrop Chemical Company, Inc.

Dr. Walter E. Daniel and the house officers in the urologic service cooperated and assisted in this study.

The sulfapyridine for this study was obtained through the Lederle Laboratories, Inc., and Merck & Co., Inc.

From the Urological Division, Department of Surgery, Duke University School of Medicine and Duke Hospital.

Read before the Section on Urology, at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

with a very low phenolsulfonphthalein curve only 43 mg., exactly comparable to the excretion of phenolsulfonphthalein. This fact, which was found true also for sulfanilyl sulfanilamide and sulfapyridine, should be kept in mind when one considers the concentration obtainable from kidneys badly damaged by infection. We⁸ have also shown that clinically the fluid intake does not affect the blood concentration or the actual amount of the drug excreted but does, of course, markedly affect the drug concentration in the urine. The differential excretion curves, therefore, of all the sulfonamide drugs follow their corresponding phenolsulfonphthalein curves, so that the total excretion depends on the drug used, the dosage administered and the renal function.

CHEMISTRY

Sulfanilamide, sulfanilyl sulfanilamide, sulfapyridine and, to a less extent, sulfathiazole form an inactive acetyl derivative in the body which is excreted in the urine along with the free or the active form. The blockage of renal tubules and ureters with acetyl sulfapyridine or sulfathiazole crystals when the patient has

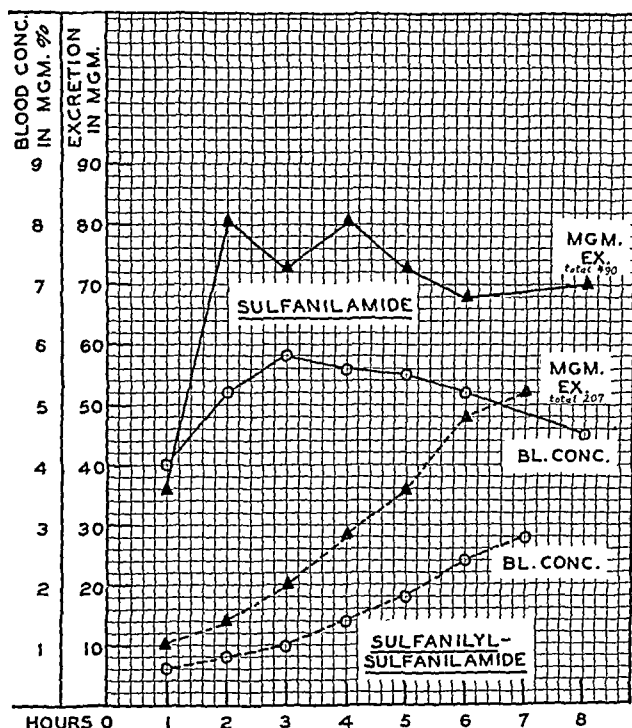


Chart 1.—Comparison of sulfanilamide and sulfanilyl sulfanilamide in regard to blood concentration and excretion; normal phenolsulfonphthalein single dose was 3 Gm.

been on large doses is well known. Hill⁹ reports that there is a greater antibacterial action in the urine of a patient to whom sulfathiazole has been administered than there is in normal urine to which an equal amount of the drug has been added. White¹⁰ comments that perhaps sulfathiazole undergoes a decomposition in the body with the excretion of another stronger bactericidal cleavage product such as aminothiazole or a derivative of it.

BACTERIOLOGY IN VITRO

Studies in vitro by Helmholz¹¹ and Long and Bliss⁷ show that sulfanilamide has bactericidal power in both

acid and alkaline urine and that the higher the concentration the greater the number of organisms and the number of strains killed. Long and Bliss found that a concentration in vitro of 200 mg. per hundred cubic centimeters was necessary to render the urine bactericidal against the colon bacillus and that one of 50 mg. per hundred cubic centimeters was necessary against a staphylococcus and group D beta hemolytic streptococcus infection. There is a definite bacteriostatic level of the drug necessary for each kind of bacterium. Helmholz and his associates have suggested that sulfanilamide is more effective with alkalization of the urine, while Kenny,⁴ Melton¹² and others have shown that it is as bactericidal with a pH of from 5.2 to 6.8. Vest and his associates¹³ have shown that the bactericidal effect is not demonstrable with huge numbers of organisms; bactericidal action varies according to the concentration of the drug, the numbers of organisms present in the culture and the specific bacterium involved. Mellon and Shinn¹⁴ state that urine has a potentiating influence on the bacteriostatic effect of sulfanilamide on *Escherichia coli*. White¹⁵ shows that there is a definite relationship between the temperature and the streptococidal activity of the sulfonamide drugs; there was a marked increase in the bactericidal power between 37 and 39 C. He suggests that it is due to the effect of the temperature on the metabolic processes of the bacteria. This is substantiated clinically by Ballenger.¹⁶ Bliss and Long¹⁷ in comparing sulfanilamide and sulfapyridine found the latter in broth cultures a more effective bacteriostatic agent against *Bacillus typhi*, colon bacilli and group B of the beta hemolytic streptococcus and neither of them bactericidal for *Staphylococcus aureus*. The thiazole derivatives of sulfanilamide in the form of sulfathiazole and sulfamethylthiazole have been reported by Barlow, Helmholz,¹⁸ Herrell¹⁹ and Long²⁰ as being more effective against the staphylococcus than sulfapyridine or sulfanilamide. Sulfathiazole has a bacteriostatic effect on all bacteria in the urine. It differs from sulfanilamide and sulfapyridine in killing *Streptococcus faecalis* and staphylococcus with a lower concentration than is needed to killed gram-negative bacilli. *Pseudomonas* was the most resistant of all, requiring a concentration of 100 mg. per hundred cubic centimeters. Hill⁹ found that at a concentration of from 50 to 100 mg. per hundred cubic centimeters none of the sulfonamide drugs were bactericidal against large numbers of bacteria, but all were against small inoculums.

BACTERIOLOGY IN VIVO

Bacteriologic studies in vitro are, of course, most important in guiding the clinical application of these new drugs. However, conclusions drawn from the experimental work in vitro are not necessarily entirely

12. Melton, G., and Beck, A.: Therapeutic Action of M and B 693 in Urinary Infections, *Lancet* 1: 867 (April 15) 1939.

13. Vest, S. A.; Hill, Justina H., and Colston, J. A. C.: Experimental and Clinical Observations on Sulfanilamide in Urinary Infections, *J. Urol.* 41: 31 (Jan.) 1939.

14. Mellon, R. R., and Shinn, L. E.: Potentiating Influence of Urine on the Bacteriostatic Effect of E. Coli in Vitro, *Proc. Soc. Exp. Biol.* 11: 111 (Nov.) 1937.

15. White, E. C.: Bactericidal Effect of Temperature to Streptococidal in Urine, *J. Bact.* 35: 549 (Nov.) 1939.

16. Ballenger, H. P., and Coleman, O. F.: Bactericidal Effect of Urinary Tract Infections with Sulfanilamide, *J. A. M. A.* 112: 1569 (April 22) 1939.

17. Bliss, Eleanor A., and Long, P. H.: Comparison of Bacteriostatic Effects of Sulfanilamide and Sulfapyridine on Bacteria in Broth Culture, *Proc. Soc. Exper. Biol. & Med.* 39: 483 (Dec.) 1938.

18. Helmholz, H. F.: Bactericidal Effect of Sulfathiazole and Methylthiazole in Urinary Infections, *Proc. Staff Meet., Mayo Clin.* 15: 65 (Jan. 31) 1940.

19. Herrell, W. E., and Brown, A. E.: Clinical Use of Sulfathiazole and Methylthiazole in Infections Caused by *Staphylococcus aureus*, *Proc. Staff Meet., Mayo Clin.* 14: 753 (Nov. 29) 1939.

20. Long, P. H.: Thiazole Derivatives of Sulfanilamide, *J. A. M. A.* 114: 870 (March 9) 1940.

9. Hill, Justina H.: Comparative In Vitro Action of Sulfanilamide, Sulfapyridine and Sulfathiazole in Urine, *J. Urol.* 43: 491 (March) 1940.

10. White, E. C., cited by Hill⁹.

11. Helmholz, H. F.: Bactericidal Power of the Urine After the Administration of Prontylin, *Proc. Staff Meet., Mayo Clin.* 12: 244 (April 21) 1937.

comparable *in vivo*. Particularly is this true in the treatment of infections of the urinary tract, since we have both the bactericidal action of the drug in the urine and the tissue or body reaction of the individual. The urologist has necessarily become a bacteriologist. The

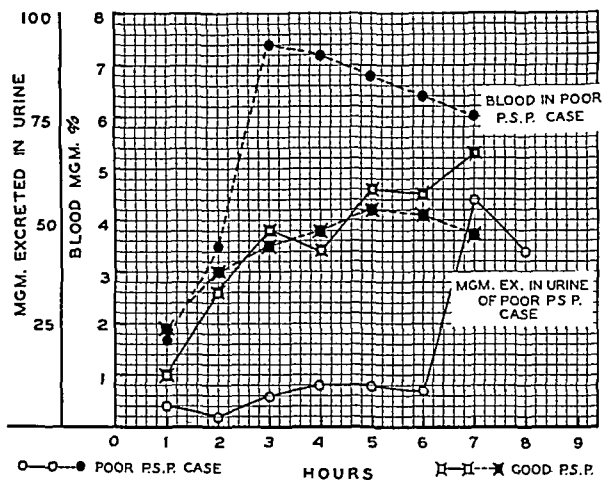


Chart 2.—Comparison of absorption and excretion in patients with normal and poor renal function.

specificity of these various drugs for certain bacteria and indeed for particular strains of the same bacterium is quite evident. It is essential to know with what particular bacterium one is dealing if one is going to treat these patients intelligently. It has been found *in vivo* as well as *in vitro* that sulfanilamide is bactericidal for hemolytic streptococci, most of the strains of colon bacilli and proteus bacilli but for only a few strains of staphylococci and *Streptococcus faecalis*. Sulfathiazole in contrast has a higher therapeutic index against staphylococci. Kenny⁴ reported forty-six cases of acute colon bacillus infections of the urinary tract in which

TABLE 1.—Sulfanilamide Therapy—Uncomplicated Cases

Bacteria	Cases	Per Cent Well	Per Cent Improved	Per Cent Unimproved
Colon bacillus.....	67	80.6	16.4	3
Staphylococcus.....	8	62.5	37.5	0
Mixed.....	10	20.0	80.0	0

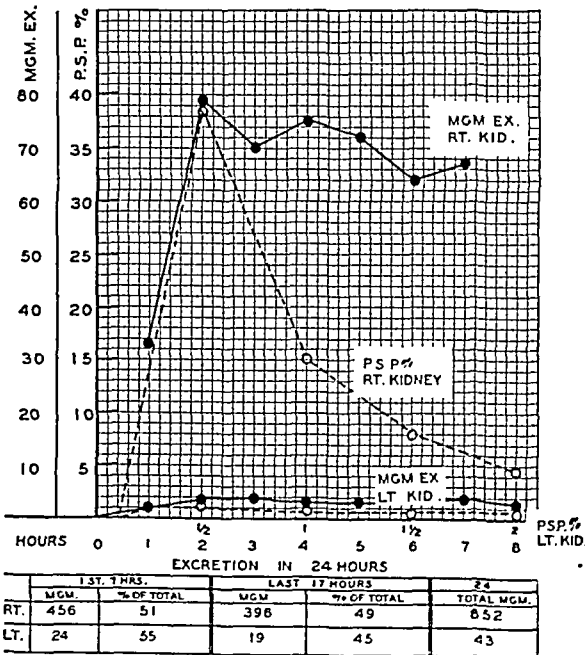
all the patients were cured. There have been many reports since then with cures varying between 75 and 90 per cent. Strains of various bacteria which are resistant *in vitro* are not necessarily resistant *in vivo*.

Our study was made in 208 cases of infections of the urinary tract. All the patients were hospitalized so that most careful clinical, biochemical and bacteriologic observations could be made. Complete urologic examinations, including pyelograms, were done on all patients. Examination of catheterized urine specimens in females and the three glass test in males were made daily, together with smears and stains. Cultures were taken frequently and the concentration of the drug in the blood and urine was determined twice a week. Our criteria for cure are repeated negative smears and stains of centrifuged specimens and negative bacteriologic cultures. Our results of sulfanilamide therapy in simple infections classified according to the infecting organism are reported in table 1: of the colon bacillus infections 80.6 per cent were cured, 16.4 per cent were improved and 3 per cent were unimproved; of the staphylococcal infections 62.5 per cent were cured and 37.5 per cent

were improved. We believe that the failure of these drugs in a certain type of bacterium in which the vast majority are successful is due to the difference in the strain rather than to insufficient concentration of the drug in the blood or urine or to the percentage of the drug conjugated. This was proved to our satisfaction²¹ in gonococcal urethritis, and the same is true with urinary infection. The rapidity of response is one of the most striking features noted. All the cured patients showed marked improvement and indeed often a complete disappearance of pus and bacteria within twenty-four hours. This occurs so frequently that we believe the drug should be changed if the patient has not reacted favorably within three days.

In cases of mixed infections the results are not so satisfactory as in those caused by a single organism. One bacterium is often completely eradicated while the other remains. This is particularly true in combined colon bacillus and staphylococcal infections. The colon bacillus disappears and most of the pus cells, but the staphylococcus often remains. Lockwood⁶ suggests that in mixed infections the staphylococcus may create environmental conditions which interfere with favorable action of the sulfanilamide on *Streptococcus haemolyticus*. It is also true that cases complicated with stones, residual urine and the like respond to a certain degree, but in very few is the infection completely eradicated.

A comparison of sulfanilamide with mandelic acid therapy is interesting. Some have reported as high as 90 per cent cures of bacillus infections with mandelic acid. In a series of nineteen patients with simple colon



GREATER PROPORTION EXCRETED IN FIRST 7 HOURS FROM BOTH NORMAL AND ABNORMAL KIDNEYS.

Chart 3.—Excretion of phenolsulfonphthalein and sulfanilamide in unilateral kidney disease. Single dose of 3 Gm. of sulfanilamide.

bacillus infections 65 per cent were cured and 35 per cent improved. After judging many reports, we conclude that mandelic acid and sulfanilamide each clear up from 75 to 80 per cent of uncomplicated colon bacillus infections. There are, however, certain circum-

21. Alyea, E. P.; Daniel, W. E., and Harris, J. S.: Sulfanilamide Therapy in Gonorrhea, *South. M. J.* 31: 395 (April) 1938.

stances in which one or the other is preferred. For infections complicated with prostatitis or seminal vesiculitis and the like, sulfanilamide is preferable because of its protean action. Mandelic acid acts only on the urinary infection and not on the associated focus of infection. On the other hand, mandelic acid is effective against *Streptococcus faecalis*, while sulfanilamide seldom destroys it. In infections of proteus and other urea splitting organisms in which it is usually impossible to obtain a urine with a p_H of 5.4, sulfanilamide

TABLE 2.—Sulfapyridine Therapy—Uncomplicated Cases

Bacteria	Cases	Per Cent Well	Per Cent Improved	Per Cent Unimproved
Colon bacillus.....	24	83.3	12.6	4.1
Staphylococcus.....	12	75	16.7	8.3
Mixed.....	6	50	50	0

is the drug of choice, as it is bactericidal in alkaline urine. Furthermore, for patients with damaged kidneys it is dangerous to use mandelic acid because of its renal irritation, while sulfanilamide is not irritating to the kidney. In acute infections of the kidney mandelic acid is rarely preferred because of its renal irritation, production of nausea, necessity of restricting fluids and the like. Elderly patients develop acidosis easily on mandelic acid therapy while sulfanilamide is tolerated well in the aged, with intelligent regulation of the dosage. Sulfanilamide acts quicker than mandelic acid and has a much larger range of specificity to bacteria. Braasch²² and others agree with these views. Because of the specificity of the drugs on different strains of bacteria it is often advisable to try first sulfanilamide and, if it fails, follow it with a course of mandelic acid. It must not be forgotten that mandelic acid administered with care is a most useful bactericidal agent. Ballenger¹⁶ has suggested hyperthermia plus sulfanilamide. This would coincide with the work, in vitro, of White.¹⁵ Ballenger first suggested associated hyperthermia in gonococcal infections and has subsequently reported its use in the treatment of nonspecific urinary infections.

Sulfapyridine has been used in the treatment of infections of the urinary tract. Melton¹² gives a clinical report of seventy-one cases. All but one of twenty-seven cases of acute pyelitis responded within from three to seven days. *Streptococcus faecalis* was found resistant also to sulfapyridine; only one case resulted in cure. Most of the infections with *Staphylococcus albus* and half of those with *Proteus* responded favorably. His dosage of 3 Gm. a day produced concentrations in the urine of from 46 to 190 mg. per hundred cubic centimeters. We have been using it in colon bacillus and staphylococcal infections (table 2). Among the cases of colon bacillus infections, 83.3 per cent were cured, 12.6 per cent were improved and 4.1 per cent were unimproved. Among those of staphylococcal infections 75 per cent were cured, 16.7 per cent were improved and 8.3 per cent were unimproved. This shows practically the same percentage of cures as that obtained with sulfanilamide in colon bacillus and slightly higher than that in staphylococcal infections.

The newest of the sulfonamide drugs used clinically are the thiazoles. DeEds,²³ working with phenothiazine, found that thionol, the active bactericidal agent

excreted in the urine, is markedly increased when the p_H of the urine is low. The dosage, therefore, may be cut in half when the urine is markedly acid. In a series of forty-nine cases, not classified according to bacteria, all but eight were cured or improved. The response was rapid, averaging thirty-five hours. Reports by Helmholtz,¹⁸ Herrell and Brown,¹⁹ Poole and Cook,²⁴ and Stirling²⁵ show that sulfathiazole is more efficacious against the staphylococcus than other sulfonamide drugs. Stirling reports eight cures of ten patients; the bacteria types are not mentioned. Poole and Cook report 65 per cent cures among fifteen patients with colon bacillus infection, seven with *Streptococcus faecalis* and five with *Staphylococcus aureus*. All of the five *Staphylococcus aureus* infections were cured. We have been using sulfathiazole in infections of the urinary tract and have found (table 3) staphylococcal infections cured in all of six cases; after treatment of nine patients with infections of staphylococcus and colon bacillus mixed, six, or 66⅔ per cent, were well and three were improved. This is, of course, too small a series from which to draw any conclusions.

DOSAGE

A considerable amount of interesting work has been done in vitro to determine the drug concentration in the urine necessary to render it bactericidal or bacteriostatic. Long⁷ and Vest¹³ show that various organisms need certain definite drug concentrations: *Bacillus coli* requires 200 mg. per hundred cubic centimeters, beta hemolytic streptococcus, 50 mg., and *Staphylococcus aureus*, 100 mg. Long suggested that each organism could be tested in vitro for each individual case and the particular bactericidal concentration determined. Mitchell²⁶ states that a concentration in the urine of 100 mg. per hundred cubic centimeters is needed to make the urine bactericidal and then 35 mg. per hundred cubic centimeters is needed to keep it so. Long and Vest suggest that a dosage of from 3 to 5 Gm. of sulfanilamide a day with fluids restricted to 1,200 cc. is bactericidal for most of the common organisms. We therefore started treatment of infections of the urinary tract in our clinic according to this regimen. In all these cases almost daily centrifuged specimens were

TABLE 3.—Sulfathiazole Therapy

Bacteria	Cases	Average Blood Concentration, Mg. per 100 Cc.	Average Urine Concentration, Mg. per 100 Cc.	Per Cent Well	Per Cent Improved	Per Cent Unimproved
Colon bacillus....	2	...	...	...	100	..
Staphylococcus...	6	2.1	36	100	—	—
Mixed.....	9	...	..	66	34	—

examined for pus and bacteria. Frequent cultures were taken and blood and urine concentrations determined twice a week. Table 4 A shows that 73.7 per cent of the patients with infections of colon bacillus were cured and 21 per cent were improved. In this group the concentrations in the urine varied from 75 to 250 mg. per hundred cubic centimeters, with an average of 117 mg. Concentrations in the blood averaged 5.7 mg. per hundred cubic centimeters. Many of the patients on this

22. Braasch, William: Status of Chemotherapy for Infections of the Urinary Tract, *Am. J. Surg.* 45: 472 (Sept.) 1939.
23. DeEds, Floyd; Stockton, A. B., and Thomas, J. O.: Phenothiazine, Antiseptic Value, *J. Pharmacol. & Exper. Therap.* 65: 353 (April) 1939.

24. Poole, T. L., and Cook, E. N.: Sulfathiazole and Sulfamethylthiazole in Treatment of Urinary Infections, *Proc. Staff Meet., Mayo Clin.* 15: 113 (Feb. 21) 1940.
25. Stirling, W. C.: Report of Two Cases of Septicemia with Recovery Following Sulfathiazole, personal communication to the authors.
26. Mitchell, D. R.: Sulfanilamide as a Urinary Antiseptic, *Canad. M. J.* 39: 22 (July) 1938.

regimen acquired objectionable toxic symptoms, which in several cases necessitated stopping the drug. In our outpatient clinic we noted that patients obtained equally good results with much lower concentrations of the drug in the urine. We then treated a series of patients in the hospital with a dosage of 3 Gm. a day but with fluids forced to 4,000 cc. a day. This, of course, cut down the concentration markedly to an average of 52.5 mg. per hundred cubic centimeters. Table 4B shows that 71.4 per cent of the bacillus infections were cured and 29.6 per cent were improved. We therefore conclude that *in vivo* the person's tissue or body reaction to the drug is of more importance than the concentration in the urine. This is in line with evidence found by Buchtel and Cook² and others that a prostatic infection may be cured when the concentration in the prostatic secretion is far below its bactericidal level. Furthermore, many staphylococcal infections were not cured even though its concentration in the urine was far above its "in vitro bactericidal level."

In another series we lowered the dosage of the drug to 1.8 Gm. a day and varied the fluid intake. Group 3, table 5 A, with a fluid intake of 1,800 cc. a day, had an average concentration of the drug in the urine of

TABLE 4.—Sulfanilamide Therapy

Bacteria	Cases	Average Blood Concentration, Mg. per 100 Cc.	Average Urine Concentration, Mg. per 100 Cc.	Per Cent Well	Per Cent Improved	Per Cent Unimproved
A. Sulfanilamide 3 Gm., Fluids 1,800 Cc., Daily						
Colon bacillus....	19	5.7	117	73.7	21	5.3
Staphylococcus...	2	...	...	50.0	50.0	...
Mixed.....	3	...	...	66.6	33.3	...
B. Sulfanilamide 3 Gm., Fluids 4,000 Cc., Daily						
Colon bacillus....	14	4.6	52.5	71.4	29.6	—
Staphylococcus...	5	...	...	60.0	40.0	...
Mixed.....	1	...	...	...	100	...

61.3 mg. per hundred cubic centimeters and a concentration in the blood of 3.5 mg. per hundred cubic centimeters. Group 4, table 5 B, had fluids forced to 4,000 cc. a day and averaged a concentration in the urine of 30 mg. per hundred cubic centimeters. The results in these two groups, as shown in table 5, are equal to and just as good as those in groups 1 and 2, table 4, which received the larger dosage. This agrees with our experience in the outpatient clinic, where equally good results are obtained on the small dosage of 1.8 Gm. a day with no restriction of fluids. These outpatients, however, are not included in this series because of insufficiently careful bacteriologic and biologic studies.

From the tables it is also apparent that the results in staphylococcal and mixed infections are the same with large and with smaller dosage. No patients failing to respond to 1.8 Gm. a day showed any improvement when the dosage of the drug was raised. Mitchell²⁶ has made similar observations. We are convinced, therefore, that a dose of 1.8 Gm. of sulfanilamide a day is just as efficacious in the treatment of infections of the urinary tract as larger doses. Furthermore, a concentration bactericidal *in vitro* is not necessary "in vivo." Hence fluids need not be restricted. Similar studies were made with sulfapyridine, 2 Gm. a day being used while the fluid intake was varied. Table 6 shows no difference in results between restricted and forced fluids. It is also evident that approximately the same percentage of colon bacillus infections was cured with

this drug as with sulfanilamide. Staphylococcal infections showed a higher percentage cured than there were with sulfanilamide.

There have been many reports of the use of sulfanilamide in pyelitis of pregnancy. From the obstetric department of Duke Hospital we selected seventeen

TABLE 5.—Sulfanilamide Therapy

Bacteria	Cases	Average Blood Concentration, Mg. per 100 Cc.	Average Urine Concentration, Mg. per 100 Cc.	Per Cent Well	Per Cent Improved	Per Cent Unimproved
A. Sulfanilamide 1.8 Gm., Fluids 1,800 Cc., Daily						
Colon bacillus....	10	3.5	61.3	70	30	0
Staphylococcus...	0	...	...	...	...	...
Mixed.....	3	...	...	...	100	...
B. Sulfanilamide 1.8 Gm., Fluids 4,000 Cc., Daily						
Colon bacillus....	23	2.5	30	70	...	30
Staphylococcus...	1	...	...	100	...	...
Mixed.....	3	...	...	...	100	...

patients treated with doses of approximately 4 Gm. a day. Biochemical and bacteriologic studies were not sufficiently complete to include these in our series. In this group sixteen patients were symptomatically well after six days of therapy. There were ten colon bacillus, four staphylococcal and three mixed infections. All but one showed a rapid and marked drop of temperature and clinical improvement within twenty-four to forty-eight hours.

All cases reported so far have been simple or uncomplicated. There is also a group of twenty-eight cases of urinary infections with complications such as stones, ureteral stricture and the like in which fourteen showed marked improvement; in nine of these fourteen cases there had been a nephrectomy or stones had been removed from the kidney, so that postoperatively they really became uncomplicated cases. This leaves only five of the remaining seventeen complicated cases which were improved on these drugs. There were fourteen that were unimproved. Our experience is therefore

TABLE 6.—Sulfapyridine Therapy

Bacteria	Cases	Average Blood Concentration, Mg. per 100 Cc.	Average Urine Concentration, Mg. per 100 Cc.	Per Cent Well	Per Cent Improved	Per Cent Unimproved
A. Sulfapyridine 2 Gm., Fluids 1,800 Cc., Daily						
Colon bacillus....	4	2.9	124	75	25	—
Staphylococcus...	5	...	...	60	40	—
Mixed.....	2	...	...	50	50	—
B. Sulfapyridine 2 Gm., Fluids 4,000 Cc., Daily						
Colon bacillus....	20	1.9	21	85	10	5
Staphylococcus...	7	...	...	85.7	—	14.3
Mixed.....	4	...	...	50.0	50.0	...

similar to that of others in that urinary infections complicated by other pathologic changes rarely respond to sulfanilamide therapy alone.

Our experience in the response of the infection in cases of post-transurethral resection to these drugs is similar to that of others;²⁷ namely, that it is of very little use in clearing up the urine. It may prevent mild postoperative complications. Preoperatively we

27. Gaudin, H. J.; Zide, H. A., and Thompson, G. J.: Use of Sulfanilamide After Transurethral Prostatic Resection, *J. A. M. A.* **110**: 1887 (June 4) 1938. Mitchell, Greay and Lucas.²⁸ Veit, Hill and Colston.²²

often prescribe it prophylactically to patients with sterile urine, but whether it really prevents infection is questionable.²⁸ In treatment of the bladder infection following transurethral prostatic resection we now delay the administration of the drug for a period of three weeks after the operation. In a good percentage of cases at this time the drug is of considerable help and we have seen many of these infections clear up within a period of forty-eight hours on 1.8 Gm. a day. The use of the small dosage in this group of elderly patients is of particular advantage.

Every one is now familiar with the toxic reactions of these drugs and nothing new can be added. All our patients tolerated with ease the drugs in the doses here recommended. Individual variations in tolerance of one drug or the other was encountered. At these low dosages it would be difficult to say that one was more easily tolerated than the other; it varied with different individuals.

In this study we have been struck with the accumulating evidence for specificity of reaction of these drugs to bacteria and different strains of the same type organism. The rapidity of response has also been mentioned. It has become our routine, therefore, to start a patient on the drug which we believe most suitable to his infection. If there is no favorable response in three or four days the drug is changed to one of the other sulfonamide drugs or to mandelic acid, depending on the organism and the patient. Because of our excellent results with sodium sulfanilyl sulfanilamide in sulfanilamide-resistant gonorrhea²⁹ we have used this drug in resistant infections of the urinary tract. A few of these cases responded favorably when all other sulfonamide drugs had failed.

Nothing has been said of the "old reliable" treatments of coccic infections with neoarsphenamine or the use of methenamine or many other well known and perhaps erroneously called urinary antiseptics. We can add nothing to what is already quite familiar. Recurrences have not been discussed because our reports may be unreliable. We know that there were seven recurrences in our series, but of course more may have occurred and the patients not reported to us.

SUMMARY AND CONCLUSIONS

1. The sulfonamide drugs are excreted by the kidneys in a manner exactly similar to phenolsulfonphthalein.
2. *In vitro* and *in vivo* studies show the specificity that the sulfonamide drugs have for different bacteria and different strains of the same bacterium.
3. Experimental studies *in vitro* are not necessarily entirely comparable *in vivo*.
4. The action of sulfonamide drugs in infections of the urinary tract depends more on the tissue reaction than on direct bactericidal action in the urine.
5. Mandelic acid is an excellent drug for infections with colon bacillus and *Streptococcus faecalis*.
6. A comparison of the colon bacillus infections treated with sulfanilamide and sulfapyridine shows practically the same, or 81 per cent, cured.
7. A comparison of the same drugs in staphylococcal infections shows that with sulfapyridine 75 per cent and with sulfanilamide 62.5 per cent were cured.

8. Response to the sulfonamide drugs is rapid, usually within two or three days.

9. Infections complicated by other pathologic changes do not respond as favorably as the simple infections.

10. A comparison of sulfanilamide and mandelic acid therapy in various types of cases shows that sulfanilamide is usually preferable.

11. Evidence shows that the high drug concentration in the urine usually thought desirable is not necessary for cures.

12. A dosage of 1.8 Gm. of sulfanilamide a day with fluids forced produced as good results as 3 Gm. a day with restricted fluids. The same is true with sulfapyridine.

13. Many patients cannot take the large doses with restricted fluids, but the recommended small dosage is easily tolerated by all.

SULFATHIAZOLE

A REPORT ON CLINICAL INVESTIGATIONS

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AND

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Sulfathiazole, a derivative of sulfanilamide, was submitted to us for clinical investigation. Laboratory and animal experimental work indicated a low degree of toxicity and a high degree of protection against many virulent organisms, especially the staphylococcus, pneumococcus and gonococcus. This study includes 200 controlled patients. The drug was administered orally in 0.5 Gm. tablets to adults, smaller portions being given to children and babies. The sodium salt was given intravenously, a 1 Gm. ampule dissolved in 100 cc. of sterile distilled water injected slowly. The powder was used locally, sprinkled generously in infected wounds or introduced by insufflation into cavities.

A study of the absorption, dosage, toxicity and effectiveness of the drug follows:

ABSORPTION

The absorption of the thiazole compounds when given by mouth is quite variable, much more so than that of sulfanilamide or sulfapyridine. For example, one patient receiving 6 Gm. daily had a concentration in the blood of less than 1 mg. per hundred cubic centimeters. On the other hand, 4 Gm. administered to another adult patient was sufficient to maintain a concentration of 6 mg. per hundred cubic centimeters in the blood. The experimental work with animals indicates that a large amount of the drug is often recovered from the feces when the blood concentration is low, indicating most probably that the drug remains unabsorbed in some instances. It is therefore important to know the concentration of the drug in the blood of patients who are not responding favorably to the usual dose; if the concentration is less than 5 mg. per hundred cubic centimeters, the dose by mouth should be increased

28. Mitchell, D. R.; Greey, P. H., and Lucas, C. C.: Sulfanilamide in Treatment of Cystitis and Pyelitis, *Canad. M. J.* 40: 336 (April) 1939.
29. Alyea, E. P., and Daniel, W. E.: Treatment of Sulfanilamide-Resistant Gonorrhea with Sodium Sulfanilyl-Sulfanilamide, *J. Urol.* 42: 864 (Nov.) 1939.

From the Urological Department of the St. Louis University School of Medicine.

Read before the Section on Urology at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

For this study sulfathiazole was made available by the Department of Medical Research of the Winthrop Chemical Company, Inc., New York.

to produce a satisfactory effect. The peak of blood concentration occurs with sulfathiazole in about four hours after administration and begins to decline after six hours. For example, an adult patient suffering of staphylococcal cortical abscess of the kidney was given 2 Gm. of sulfathiazole at 9 a. m., and blood concentrations were reported as follows: at 11 a. m., 2.1 mg. per hundred cubic centimeters; at 1 p. m., 5.2 mg.; at 2 o'clock, 5 mg., and at 3 o'clock, 4.2 mg. This is of clinical importance, indicating that the dosage of the drug should be spaced every four to six hours throughout the twenty-four hours in cases of serious involvement. After a single oral dose of 4 Gm., 1 Gm. is recovered from the feces and urine in the first twenty-four hours, 2.5 Gm. in forty-eight hours and some traces are found as late as seven days after administration.

DOSAGE

The usual prescribed dose for an adult is two 0.5 Gm. tablets orally every six hours. In the more severe cases a larger amount may be given with impunity. We have given as much as 14 Gm. daily with no harmful effects; one woman was given 1 Gm. of the sodium salt dissolved in 200 cc. of sterile distilled water intravenously, together with 6 Gm. orally in twenty-four hours; a blood concentration of 17 mg. per hundred cubic centimeters was obtained and there were no ill effects. Superficial lesions such as boils, abscesses, abrasions, ulcers, urethritis, pyelitis and cystitis require smaller amounts than do the deep-seated lesions such as cortical renal abscesses, pulmonary abscesses, abscesses of the liver, septicemia, osteomyelitis and meningitis.

The necessity of administering the drug in doses sufficient to bring about the therapeutic effect cannot be overemphasized. Deaths and failures have come to our notice analyses of which indicated definitely that sufficiently large doses had not been given to obtain the therapeutic effect. The medication, when tolerated, should be continued for a week or ten days after all clinical evidences of the disease have disappeared. The experimental work with animals performed by Lloyd Jones of the Bacteriological Department of St. Louis University indicates that positive staphylococcus cultures could be obtained from the tissues of animals coming to autopsy two weeks after administration of the drug over a fourteen day period. Children tolerate the drug well. Six grains (0.4 Gm.) daily was given in the milk formula to a 20 day old baby suffering from staphylococcal septicemia, from which he recovered. We have given children larger doses than those indicated by Young's rule. For example, children from 2 to 5 years of age have received 2 Gm. daily. In a child aged 2 years receiving 1 Gm. a blood concentration of only 0.1 mg. per hundred cubic centimeters was maintained and when 2 Gm. was given the blood concentration was held at 5 mg., with resultant recovery from staphylococcal pyelitis. No ill effects have been noted in elderly patients or in those with poor kidney function. Caution should be used, however, in treating patients with known liver and kidney deficiency, since the drug is eliminated through these organs. Sulfathiazole is best tolerated with food in the stomach and has been given beneficially with diluted hydrochloric acid rather than with the alkalis so often administered with sulfanilamide.

TOXICITY

Fifteen per cent of patients receiving sulfathiazole have complained of various drug symptoms, and in a

considerable portion of this group the drug had to be discontinued because of the severity of the reactions. Pain in the abdomen, nausea, vomiting, headache, anorexia, melancholia, weakness, cutaneous rash, diarrhea, undue excitability and nervousness have been the chief complaints. A peculiar conjunctivitis, unique for this drug, was observed by us after we heard it discussed by Perrin Long in his series. Acetyl concretions have been noted in the bladder, ureters and kidney pelvis of the experimental animals following administration of sulfathiazole, but no instance of concretions or anuria has been encountered in our series. Unusual concentrations of the crystals, causing marked cloudiness in the urine, have been noted, but increased fluid intake and a reduction or discontinuance of the drug caused this to disappear promptly. Red blood cells, albumin and casts have been noted in a small percentage of patients receiving the drug. It is to be noted that, should concretions appear, they, like those formed by sulfapyridine, are not opaque to the x-rays and are not affected by a change in the pH of the urine but are dissolved in distilled water at a temperature of 106 F.¹ The treatment, therefore, for scanty urine or complete anuria is withdrawal of the drug, forcing of fluids and cystoscopic lavaging of the kidney pelvis with hot sterile distilled water.

EFFECTIVENESS

Our clinical series includes many forms of infections in the urinary tract and also infections affecting other tissues treated in collaboration with attending physicians in other fields. We have found that the drug is effective against the staphylococcus, pneumococcus, gonococcus, *Streptococcus faecalis*, *Aerobacter aerogenes* and, to a less extent, *Bacillus proteus* and *Bacillus pyocyaneus*.

Since infections due to the staphylococcus have been notoriously resistant to all previously known medication, our chief interest has been centered around this organism. Chronic urethritis, in which the staphylococci are found on careful examination enmeshed in the shreds, has responded in three or four days to small doses of the medication. Infections of Cowper's gland and prostatitis have yielded in the acute phases, but permanent cures have not resulted in the majority of cases of chronic prostatitis treated. In infections due to residual urine or retarded flow of urine, such as cystitis due to neurogenic bladder or prostatic hypertrophy, diverticulitis, pyonephrosis and even urethritis, the urine did become culturally clear, but invariably the infection returned if the cause of the retarded flow was not corrected.

The promptness with which the infections accompanying renal, ureteral and bladder calculi are eradicated will prove to be of great benefit in preventing recurrences.

Staphylococcal septicemia, perirenal abscesses and abscesses of the renal cortex have responded favorably to the medication, but in each instance surgical drainage was instituted as usual. Staphylococcal pulmonary abscesses, osteomyelitis and acute multiple arthritis of staphylococcal origin were among the conditions that responded favorably. Postoperative wounds of staphylococcal origin and stitch abscesses have cleared up in forty-eight hours after administration of the drug.

1. Carroll, Grayson; Shea, John, and Pike, George: Complete Anuria Due to Crystalline Concretions Following the Use of Sulfapyridine in Pneumonia, *J. A. M. A.* 114: 411-412 (Feb. 3) 1940.

Boils and carbuncles have yielded promptly, and the recurrence of boils has been prevented. In all instances of infection of the urinary tract in which free drainage has not been instituted, recurrences have been most prevalent.

One of the most remarkable results has been obtained in the treatment of lesions about the penis, on which the powder of sulfathiazole was applied locally twice daily. Old Ducrey infections cleared up within four days. Herpes responded to local treatment in three days. Gonorrheal infections in the male and female, involving all sorts of complications, have responded more promptly and have shown less tendency to recur than after either sulfanilamide or sulfapyridine therapy. A more detailed report will probably be given by Dr. Roger Deakin of St. Louis, who has carried out carefully controlled studies. Pouring powder into an infected pyelotomy or ureterotomy wound has proved very useful. Only a few of the cases of acute epididymitis that were under treatment have responded well to the medication.

Far afield from urology, but of value nevertheless, is the effectiveness of the drug against impetigo in the nursery. Dr. P. J. Manion and Dr. Hollis Allen of St. Louis conceived the idea of putting the powder of sulfathiazole in the bath soap used in the nursery and thus completely eliminated impetigo in the nursery. When this practice was discontinued because of a temporary inability to obtain the drug, the impetigo reappeared. Local application of the powder on the weeping lesions of impetigo produced favorable response within forty-eight hours.

The in vitro investigations of Dr. Justina Hill² are reported as follows:

The action of sulfathiazole as present in urine after administration of the drug, as compared with the action of the same amount added to normal voided urine, showed a striking advantage in favor of the former. This indicated possibilities of changes of sulfathiazole during passage through the body which deserve further consideration.

The fact that all of the drugs tested have direct action in urine against small inocula is confirmed, and the limitations of antibacterial action are emphasized. The much larger amounts of sulfathiazole which may be expected in urine as compared with sulfanilamide and sulfapyridine and the intensification of the action of sulfathiazole by passage through the body indicate the possibility that sulfathiazole will be a more valuable urinary antiseptic than either sulfanilamide or sulfapyridine.

The comparative effect of sulfanilamide and sulfathiazole in vitro was reported by Charles H. Rammelkamp and Chester S. Keefer³ in the April issue of the *Proceedings of the Society of Experimental Biology and Medicine* and reveals that when ten or more organisms were added to the blood without any drug and incubated for forty-eight hours there were at least 10⁸ organisms present at the end of twenty-four hours. With sulfanilamide the same was true. Sulfathiazole, however, showed bacteriostatic and bactericidal properties. The number of organisms actually decreased during incubation. This decrease was striking even when as many as 100,000 organisms per cubic centimeter were used.

The bacteriostatic actions of the thiazole derivatives of sulfanilamide on bacteria in broth cultures shows the following:⁴

Three new thiazole derivatives of sulfanilamide have been studied with respect to their bacteriostatic action upon microorganisms. These compounds were found to be superior to sulfanilamide and sulfapyridine in their inhibitory actions upon pneumococci types I, II and III and beta Streptococcus haemolyticus group A in concentrations as low as 5 mg. per cent. Concentrations of 1 mg. per cent proved the new derivatives to be more effective against the gonococcus than the parent compound and sulfapyridine. The methyl and phenyl derivatives were found to be markedly bacteriostatic for Staphylococcus aureus. Sulfanilamide and sulfapyridine exhibited a moderate degree of inhibition upon the latter organism.

Dr. Barlow⁵ concurs in this. From the observations of others and from our clinical experience we have found it apparent that the sprinkling of powder into an infected wound or on a lesion is of definite value. Since most open abrasions and wounds of the skin are infected by the staphylococcus, the sulfathiazole used in powder form may prove of great value at this age, when injuries are so common.

SUMMARY

Sulfathiazole has proved clinically effective in a very positive manner against staphylococci, gonococci and pneumococci. Recovery has resulted following its use in renal abscesses, carbuncles, furunculosis, osteomyelitis, septicemia, ulcers of the penis, pyelonephritis, impetigo and other infections.

609 Humboldt Building.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. ALYEA AND ROBERTS AND
DRS. CARROLL, KAPPEL AND LEWIS

DR. CHARLES A. W. UHLE, Philadelphia: In the management of every case one must differentiate between clinical cure and bacteriologic cure. The first cycle of action in chemotherapy is the production of a bacteriostatic phase in which symptoms ameliorate or completely subside but culture still remains positive. This calls for medication well into the symptom-free period if there are no untoward toxic effects, with perhaps a repetition of the course at periodic intervals. The ignorant or uncooperative patient, believing himself cured, will stop treatment. He then becomes a carrier and a social menace. In an analysis at the Philadelphia General Hospital of twenty cured cases of gonococcal urethritis treated with sulfapyridine, Drs. Knight, LaTowsky and Uhle found that the average number of carrier days was 17.7 with a range of from two to fifty days. In our ambulatory patients treated with sulfapyridine there was a high percentage of mild toxicity, whereas with sulfathiazole the toxicity was negligible. At the Philadelphia General Hospital crystalline precipitates of sulfathiazole in the papillae of the kidney and free crystals in the pelvis and ureter have been found at autopsy of pneumonia patients. In a recent analysis of pneumonia patients treated with sulfapyridine and sulfathiazole, Dr. Flippin has demonstrated that where high conjugated radicals are found crystalline precipitation is most likely to occur. Blood level determinations thereby seem to assume added importance in guiding the patient through an uncomplicated convalescence. Many of the more elaborate tests are not regularly indicated, however, when lower dosage is maintained in ambulatory patients. We have studied various forms of acute gonorrhea treated with sulfapyridine. Cures have averaged 92 per cent; the average time of cure as evidenced

2. Hill, Justina H.: The Comparative In Vitro Action of Sulfanilamide, Sulfapyridine and Sulfathiazole in Urine, *J. Urol.* 43: 491-495 (March) 1940.

3. Rammelkamp, C. H., and Keefer, C. S.: Sulfathiazole: Effect on Staphylococcus Aureus in Vitro, *Proc. Soc. Exper. Biol. & Med.* 43: 664-668 (April) 1940.

4. Lawrence, C. A.: The Bacteriostatic Actions of the Thiazole Derivatives of Sulfanilamide on Bacteria in Broth Cultures, *Proc. Soc. Exper. Biol. & Med.* 43: 92-97 (Jan.) 1940.

5. Barlow, O. W.: Laboratory Data—Sulfathiazole, Department of Medical Research, Winthrop Chemical Company, Inc.

by repeated cultures was forty days. These patients received 3 Gm. of sulfapyridine a day for an average of eleven days.

DR. ROGERS DEAKIN, St. Louis: Two years ago the male genito-urinary section of the Washington University Clinics undertook an intensive study of male gonorrhea. Of 474 unselected men applying for treatment during a twenty-two month period only forty-seven (10 per cent) have been lost; 62 per cent have already been cured after satisfying our tests of cure. These include various provocative tests, a minimum of four negative cultures and a period of observation averaging well over four months. Twelve per cent of the group are still under treatment; the remaining 15 per cent have been closed without proof of cure because of reinfections, transfer to other treatment agencies, or other reasons. We have found a type of work sheet most helpful in keeping the clinic personnel acquainted with what was happening to our cases. These charts serve as constant visual reminders to every one concerned of how good any treatment actually is. The personal equation is almost entirely eliminated because of tangible laboratory result or case disposition posted each time a patient is seen at his weekly visit. The almost complete absence of side reactions with sulfamethylthiazole which Dr. Carroll and his co-workers mentioned was particularly striking. Our experiences with side reactions in sulfathiazole have been the same, although we have not been impressed with any correlation between therapeutic response and blood concentration. One of the charts illustrates a method which we are using to check the validity of our results. The percentage of negatives obtained in three different treatment routines has been plotted for a nine week period. The percentage differences have been subjected to the test of significance each week; i. e., if the difference between two percentages (expressed in standard deviation units) is less than 1.96 the difference is not significant. A difference this large might occur five out of a hundred times merely by chance. If the difference is greater than 2.58 the difference is significant, in that it would occur from chance less than once out of a hundred times. It will be noted in each comparison that the differences are above the significant level between the second and sixth weeks. It is fair to assume that the early differences in therapeutic response can be attributed to the different drugs used and that at or about the sixth week the normal defense mechanism of the body against the gonococcus becomes the predominant factor in cure.

DR. W. RAY JONES, Seattle: One who has looked into such a bladder remembers that tuberculosis is localized in islands and is not a general infection in the beginning. In urethral gonorrhea infection begins in islands also and is limited. Infection is in that island: Why does it not spread to the touching surfaces? The infiltration has involved the mucosa and submucosa, so that it is almost one homogeneous mass. Infection is continued; as one island recovers another reinfects it; this way one locally may recover and be reinfecting several times before there is final complete recovery. A section of a gonococcus infected sinus showing islands located in the submucosa explains the why of reinfections and why the sulfanilamide group drugs are more efficient in treatment than is local therapy. Local therapy kills the organisms on the surface but does not touch the ones down in the little groups scattered about. A higher power section shows one of those infected islands breaking out through to the surface to reinfect. Here is an epithelized canal with the gonococcal infection down below the surface and the gonococci localized in that. It is breaking through the epithelized surface to bring infection back after a seeming cure. Sulfanilamide reaches not only the surface organisms but also those in the deeper localized islands of infection.

DR. REED M. NESBIT, Ann Arbor, Mich.: I wish to discuss the paper of Drs. Alyea and Roberts as regards the site of action of the sulfanilamide compounds. It was of interest to me to see a patient come into our clinic on whom we had previously performed bilateral urethral transplantation for carcinoma of the bladder. He had an acute gonorrheal urethritis and prostatitis. We gave him sulfapyridine and he got well by culture as well as by stain in five days. The urinary concentration in that case did not cure him.

FURTHER EXPERIENCE WITH DIVINYL ETHER (VINETHENE) ANESTHESIA

REPORT OF 2,050 ADMINISTRATIONS

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Since the introduction in 1930 of divinyl ether as an anesthetic agent by Leake and Chen¹ and the preparation of the pure drug by Ruigh and Major,² there have been numerous reports in the literature dating from the study by Knoefel and his co-workers³ as to the chemical and pharmacologic properties of this substance. The clinical reports dealing with divinyl ether have appeared more frequently from Canadian, English and German authors. Since first used on human beings (themselves) by Gelfan and Bell,⁴ the larger series of cases in this country have been reported, among others, by Goldschmidt, Ravdin, Lucke, Muller, Johnston and Ruigh,⁵ Bourne and Sparling,⁶ Marvin,⁷ Beach,⁸ Ravdin and his co-workers⁹ and Feldman and Cartin.¹⁰ In a previous communication from this institution 335 administrations were reported. Since vinethene has, in our experience, become increasingly popular, a report is being made of our clinical results.

This study covers a total of 2,050 consecutive administrations. It was the only anesthetic used in 325 instances and was used as an induction agent preceding ether in 1,703 instances; the remaining twenty-two administrations represent vinethene inhalations supplemental to nitrous oxide-oxygen, ethylene-oxygen, avertin with amylene hydrate, and spinal or intravenous evipal soluble anesthesia.

SUBJECTS AND PROCEDURE

Since vinethene was the only anesthetic agent employed in 325 instances, we feel that an analysis of these administrations is of particular importance. The patients ranged from 10 months to 61 years of age, as follows: less than 1 year two, from 1 to 9 years 259, from 10 to 19 years forty-eight, from 20 to 29 years eight, from 30 to 39 years four, from 40 to 49 years two, from 50 to 59 years one, and 61 years one. The sex ratio was 152 female and 173 male. The operations performed are seen in table 1. Myringotomies, extractions and incision and drainage of abscesses are particularly frequent, although a rather wide variety of minor surgical procedures is included.

From the Department of Surgery of the University of Chicago.

1. Leake, C. D., and Chen, Mei-Yü: Anesthetic Properties of Certain Unsaturated Ethers, *Proc. Soc. Exper. Biol. & Med.* **28**: 151-154 (Nov.) 1930.

2. Ruigh, W. L., and Major, R. T.: The Preparation and Properties of Pure Divinyl Ether, *J. Am. Chem. Soc.* **53**: 2662-2671 (July) 1931.

3. Knoefel, P. K.; Guedel, A. E., and Leake, C. D.: Experimental Observations on the Anesthetic Properties of Divinyl Ether, *Proc. Soc. Exper. Biol. & Med.* **29**: 139-140 (Nov.) 1931.

4. Gelfan, Samuel, and Bell, I. R.: The Anesthetic Action of Divinyl Oxide on Humans, *J. Pharmacol. & Exper. Therap.* **47**: 1-3 (Jan.) 1933.

5. Goldschmidt, Samuel; Ravdin, I. S.; Lucke, Baldwin; Muller, G. P.; Johnston, C. G., and Ruigh, W. L.: Divinyl Ether, *J. A. M. A.* **102**: 21 (Jan. 6) 1934.

6. Bourne, Wesley, and Sparling, D. W.: Some Aspects of Vinyl Ether (Vinethene) Anesthesia, *Anesth. & Analg.* **14**: 4-7 (Jan.-Feb.) 1935.

7. Marvin, F. W.: Clinical Use of Vinethene, *Anesth. & Analg.* **14**: 257-262 (Nov.-Dec.) 1935.

8. Beach, E. W.: Further Experiences in Scope and Utility of Vinethene Anesthesia in 2,630 Cases, *Anesth. & Analg.* **15**: 214-217 (Sept.-Oct.) 1936.

9. Ravdin, I. S.; Eliason, E. L.; Coates, G. M.; Holloway, T. B.; Ferguson, L. K.; Gill, A. B., and Cook, T. J.: Divinyl Ether, *J. A. M. A.* **105**: 1163-1167 (April 3) 1937.

10. Feldman, M. H., and Cartin, Samuel: Vinyl Ether (Vinethene) for Dental Surgery, *J. Am. Dent. A.* **25**: 616-622 (April) 1938.

The preoperative condition of these patients was very variable. Some of the preoperative complications were as follows: A high percentage of the myringotomies and some other operations were performed on patients who had acute infections of the upper respiratory tract. Included are instances of acute sinusitis, streptococcal throats, acute tonsillitis, asthma, sniffles since birth,

TABLE 1.—*Vinethene Alone*

Myringotomies	123
Extractions	99
Incision and drainage of abscesses	28
Circumcision	13
Lumbar puncture, etc.	12
Adenoidectomy	8
Removal of packs	6
Tonsillectomy and adenoidectomy	5
Removal of finger nail	5
Encephalogram	5
Reduction of nasal fracture	4
Excision of superficial tumors	3
Two each: antrum windows and lavage; second stage Torek and suturing incisions; total	6
One each: cystoscopy; evacuation of hematoma; ventricular puncture; removal of needle; rectal dilation; débridement of burn; exploration of cervical mass; mastoidectomy; total	8
Total	325

bronchiectasis and other suppurative lung lesions, including a bronchopleural fistula. One patient had a previous laryngectomy, another a recent mastoidectomy and jugular vein ligation. Two had postpoliomyelitis flaccid paralysis of the legs and abdomen with some involvement of the respiratory muscles. Several patients had abscesses of the jaw. One had marked cervical adenopathy.

Two patients were classified as in poor condition because of brain lesions. Another had cyanosis and a stiff neck and in addition had had an acutely involved appendix removed twelve hours previously. One patient in fair condition had vinethene approximately three weeks after removal of a brain tumor and at the time was receiving sulfanilamide. Four had streptococcal meningitis and one had a questionable meningitis; three had lead encephalopathy; two had cerebral agenesis, and a patient with brain tumor was semicomatose but restless.

Eleven patients were recorded only as "acutely ill." Three were called "fair surgical risks." No details were given on these. Anemia and malnutrition were marked in three each. Three had acute hemorrhagic nephritis and another had sugar in the urine, 1 plus. One was jaundiced and another was very obese. One had poly-cystic kidneys.

Among cardiac abnormalities were a loud systolic murmur, a congenital condition of the heart and two instances of chronic rheumatic heart disease. Two patients had congenital syphilis. Two had eaten within three hours before anesthesia. Packs were removed from patients within twenty-four hours following various major surgical procedures. Among other individual complications were a hemolytic streptococcus septicemia, erysipelas, poliomyelitis with marked irritability, chickenpox and three cases of scarlet fever.

Premedication.—Many patients received no premedication. Eight received atropine, four morphine and atropine, three atropine, three pentobarbital sodium and one each soluble phenobarbital, and codeine and atropine. It was found to be particularly unnecessary and inadvisable to give premedication to those patients who were to be ambulatory immediately after anesthesia. Increased salivation seemed to be much less frequent than when we first employed the drug in 1936. Salivation occurred occasionally, but much less frequently

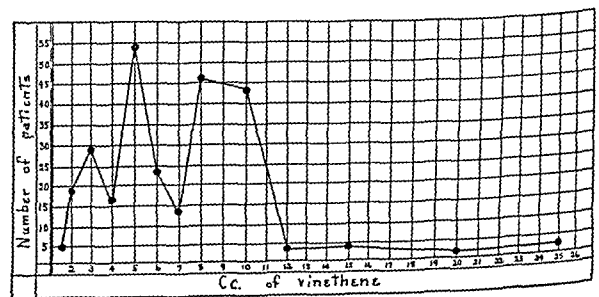
than with ether. Selective premedication may be employed, if desired, when patients are to be hospitalized. It is of interest to note that the one instance of nausea preceding anesthesia occurred in an adult after morphine premedication.

Method.—Anesthesia was induced by the open drop technic, using two thicknesses of cotton stockinet on a wire frame mask. It was felt that the surface on which the vinethene was dropped should not come in contact with the skin or mucous membranes in order to avoid a burn. The correct use of a wire ether mask, of a type corresponding to the Schimmelbusch mask, obviated this hazard. The eyes were protected with a moist pad of cotton batting. The dropper tip was held close to the mask to prevent loss by evaporation in the air before the drops reached the vaporization surface. The rate of administration was slow, between those of chloroform and ether. Air was permitted free access under the mask during induction. The patient was usually advised to count aloud. Consciousness was rapidly lost, and usually there were no manifestations of an excitement period. Table 2 shows the time required for loss of consciousness, which in 262 patients varied from twenty-five seconds to five minutes, the maximum number requiring around one minute. Vinethene may be administered by other methods, including the closed system with oxygen and the soda lime absorption technic, although such administrations are not reviewed in this report.

A variable quantity of vinethene ranging from 1 to 25 cc. was necessary for loss of consciousness, as is illustrated by the chart. It is evident that in the majority of instances only a small quantity of the drug was required for loss of consciousness.

Difficulties of Induction.—Complications are enumerated in table 3. Two of the children who had marked excitement entered the outpatient department screaming and kicking, and this persisted until after anesthetization. Both children were quiet and cooperative after anesthesia. The remaining patients exhibited no untoward symptoms, and color, respiration and cardiac response were normal. Obviously not all of the complications were attributable to the anesthesia.

Maintenance.—This was in no instance of long duration, the longest two periods being forty-five minutes. Ten were between thirty and thirty-nine minutes in



Amount of vinethene required for loss of consciousness.

length, twenty-one between twenty and twenty-nine minutes, fifty-three between ten and nineteen minutes, 114 between five and nine minutes and 125 five minutes or less. The required amount of vinethene varied considerably, depending particularly on the length of time of anesthesia and the general resistance of the patient. Five required less than 5 cc., nineteen needed 5 to 9 cc., 120 from 10 to 19 cc., eighty-seven from 20 to 29 cc., forty-one from 30 to 39 cc., twenty-seven from 40 to

49 cc., fourteen from 50 to 59 cc., five from 60 to 69 cc., four from 70 to 79 cc., one from 80 to 89 cc., and two required 120 cc. Thus it is obvious that the average patient required only a comparatively small amount of the drug for short surgical procedures.

Maintenance was almost uniformly satisfactory. One patient with acute hemorrhagic nephritis, high fever and severe infection of the upper respiratory tract had a sudden apnea lasting sixty seconds and accompanied by cyanosis. This was rapidly remedied by two minutes of oxygen insufflation. Respiratory signs were of the greatest value in denoting the stage of anesthesia, maintenance being associated with a quiet, full, regular and only slightly accelerated respiratory rate, accompanied by a full and regular pulse rate and excellent color. The eyelids frequently remained open and the eyeballs active in the upper plane of surgical anesthesia. The pupil reflex was variable. In the deeper plane of surgical anesthesia the eyeball became more fixed. The pupil may dilate and the eyelids may be closed in this plane of anesthesia. There was good relaxation of the skeletal muscles. Mucous secretions were marked in one instance and suction was necessary in another. The incidence of increased mucous secretion was low, in no way comparable to that seen with ether. As with all other anesthetics, an adequate supply of oxygen or air and an unobstructed airway were found to be essential.

Recovery.—This was rapid in every instance, consciousness usually being present almost immediately

TABLE 2.—Time Required for Loss of Consciousness

Minutes	No. of Patients	Minutes	No. of Patients
1/4.....	3	1 3/4.....	2
1/2.....	18	2.....	39
3/4.....	43	2 1/2.....	4
1.....	100	3.....	10
1 1/4.....	4	3 1/2.....	7
1 1/2.....	37		

after cessation of administration. Recovery was particularly free from untoward symptoms. Many of the patients awakened smiling as if from a normal sleep. One medical student stated that he "enjoyed the anesthetic." Several of the patients sat up at once and experienced no untoward symptoms.

In each instance in which nausea and vomiting occurred it was present immediately after the cessation of anesthesia, and in no case did it persist. One patient had slight convulsive movements lasting one or two minutes after suction was employed following a cystoscopy. There was no cyanosis present. Recovery thereafter was uneventful.

The patients cared for in the outpatient department were rational and able to be discharged almost immediately after the operation, but for conservative reasons and for fear some circulatory disturbance or other untoward symptoms might occur they were requested to rest for thirty minutes before discharge.

Most of these patients were seen at a later postoperative visit and there were no complications. Among the patients hospitalized there were no complications, unless a case of generalized urticaria occurring one day postoperatively had some relationship to the anesthesia. One patient died two weeks later of meningitis which was in no way related to anesthesia.

In spite of its pungency, no patient objected to the odor of vinethene. One physician stated that he was aware of no marked difference in the odor from that experienced during a nitrous oxide-oxygen anesthesia he had received on the same day.

VINETHENE AS AN INDUCTION AGENT

Vinethene as an induction agent before ether anesthesia has been very satisfactory because of the simplicity of apparatus and administration and the smoothness and rapidity of anesthesia. The absence of tight fitting apparatus is an advantage with those patients, particularly children, who resent such technic. We have employed

TABLE 3.—Complications During 325 Vinethene Anesthetics

Complications	Induction	Maintenance	Recovery
Nausea and vomiting.....	4	..	29
Crying before.....	12	..	..
Crying during.....	5	..	..
Nausea before.....	1	..	..
Moderate mucus.....	3	1	1
Much mucus.....	3	1	..
Cyanosis.....	1	..	..
Marked excitement.....	8	..	..
Slight to moderate muscular excitement..	26	..	..
Apnea.....	..	1	..
Convulsive movements.....	..	..	1

open drop vinethene induction preceding ether anesthesia for 1,703 patients, and this method has met with increasing popularity. It is of paramount advantage in situations in which a gas-oxygen induction is not available. The psychologic factor of sparing the patient a prolonged ether induction is important, and at the same time the toxic hazards of other nongaseous inhalation agents are avoided.

The operations performed after vinethene inductions covered a wide range of both major and minor surgery, including ninety-seven major neurosurgical procedures. Age varied from 6 months to over 70 years. Twenty-two patients were less than 1 year of age. Although the maximum number were in the 1 to 9 year group, over seventy were middle aged or elderly.

There were many preoperative complications, among the outstanding being increased intracranial pressure and numerous brain tumors, convulsions, cervical cord tumor, meningitis, chorea, several cases of hemolytic streptococcus throat, bronchial asthma, several instances of bronchiectasis, pulmonary tuberculosis, congenital syphilis, three cases of congenital heart disease and fourteen of rheumatic heart disease, marked myocardial damage, marked scoliosis, poliomyelitis with partial paralysis of the muscles of respiration, previous tracheotomy, alcoholism, nephritis, pyelitis and albuminuria. A few patients had been receiving sulfanilamide.

TABLE 4.—Induction Complications

Premedication	Patients	Slight Excitement	Moderate Excitement	Marked Excitement	Marked Mucus
Codeine-atropine.....	301	11	12	6	5
Atropine.....	238	16	18	4	6
None.....	974	107	46	15	40
Other combinations.....	190	10	2	2	3
Totals.....	1,703	144	79	28	54

Premedication varied, as can be seen in table 4. The combination of codeine and atropine was employed in 301 instances, atropine in 238 and no premedication in 974. The remaining 190 patients received morphine-atropine premedication or one of the barbiturate derivatives, either alone or in combination.

PREOPERATIVE ANESTHETIC COMPLICATIONS

The incidence of excitement during induction appears in table 4. Two patients had nausea and eight vomited during induction. A few vomited only after ether was

started. Five coughed during induction. Two of these had received atropine and one codeine and atropine. One who coughed had received no premedication but was seriously ill with a lung abscess.

During induction cyanosis was observed in four patients who had not received premedication and in two who had received codeine and atropine. Fifteen had cyanosis at intervals until large tonsils were removed and a better airway was established. This was true whether or not premedication had been given. One patient had apnea for one minute during induction, and another had slow respirations from codeine depression and required oxygen inhalations.

Fifteen had cyanosis only after ether was administered. All of these received oxygen, usually by catheter or mask but in one instance by intratracheal intubation. Eight were depressed from overpremedication and one of these required intubation; two had laryngeal stridor; two had deep cyanosis after atropine and ether; one had hiccups; an acromegalic patient was cyanotic after atropine and a very small amount of ether, and one patient had an apnea following a lumbar puncture.

Sixteen patients had marked mucous secretions only after ether was started.

TABLE 5.—Blood Sugar Determinations in Relation to Vinethene Anesthesia

Patient	Before, Mg. per 100 Cc.	After, Mg. per 100 Cc.	Difference, per Cent	Direction	Anesthesia Time	Comment
1	96.1	130.8	36.1	+	10 min.	Slight cyanosis
2	100.6	116.4	15.7	+	10 min.	
3	92.7	111.9	20.7	+	10 min.	Extreme cyanosis
4	73.6	102.8	29.7	+	10 min.	
5	67.8	71.2	9.7	+	10 min.	
6	90.4	135.6	36.4	+	10 min.	
7	100.6	101.7	1.0	±	10 min.	
8	73.5	71.2	3.1	—	10 min.	
9	102.7	120.9	17.7	+	10 min.	
10	109.6	115.3	5.2	+	10 min.	
11	125.4	152.6	27.7	+	10 min.	

Muscular tremors or convulsive movements were observed during eight inductions with vinethene. Three of these patients also had deep cyanosis and one had hiccups. Four recovered spontaneously and four needed oxygen inhalations. One of the latter definitely had vinethene overdosage. Mucus and cyanosis were present, and there was abolition of intercostal activity followed by a short period of respiratory arrest. The patient recovered rapidly with manual artificial respiration combined with intermittent mask oxygen under moderate pressure. All of these anesthetics were satisfactory with ether maintenance. All but two of the eight patients had received premedication, the patient with vinethene overdosage having had atropine and the rest a combination of codeine and atropine or morphine and atropine. One patient having had codeine-atropine premedication had an uneventful vinethene induction but had muscular tremors toward the end of an ether maintenance anesthesia.

Hemorrhage occurred in two craniotomies and in two tonsillectomy-adenoidectomy operations under ether anesthesia.

POSTOPERATIVE COURSE

There were fourteen postoperative deaths in this series. Twelve were due to intracranial lesions and occurred from one day to two months after operation. One patient died twenty days postoperatively of an intestinal obstruction. All of these deaths were unrelated to the anesthesia. The other death may have been associated with the anesthesia, although this is ques-

tionable. It was reported in detail in our previous communication.¹¹

Thirty-four patients who had tonsillectomy-adenoidectomy procedures had postoperative hemorrhage, none necessitating return to the operating room. This occurred from the day of operation to the eighth postoperative day. It is of interest that of those having received premedication eleven had hemorrhage during the first forty-eight hours, mostly occurring a few hours after operation; while two had hemorrhage from three to eight days later. Of those without premedication seven had hemorrhage during the first forty-eight hours, while fourteen had hemorrhage several days after operation. Hemorrhage was controlled mostly by packing. A few patients needed intravenous fluids, and three received blood transfusions.

Postoperative fever was observed in twenty-four patients. In twenty-two instances it was unrelated to anesthesia and in two instances it was very questionably related.

One patient undergoing extirpation of an acoustic neuroma had received atropine and vinethene and ether (intratracheal). Facial weakness and inability to talk and swallow immediately followed operation and bronchopneumonia developed, but complete recovery occurred. Three had cough and coryza postoperatively, two having had an infection of the upper respiratory tract before operation and one a bilateral pulmonary tuberculosis. One patient who had an inguinal herniotomy after receiving atropine had much mucus during operation and coarse rales postoperatively.

Two patients had postoperative cyanosis on the day of operation. One of these had considerable mucus during anesthesia and the other was a semistuporous patient with an intracranial lesion.

Twenty patients had emesis on the day of operation, and one who had received codeine and atropine had emesis for three days postoperatively.

Neurologic complications include an unexplained convulsion one day after removal of very large tonsils and adenoids, the facial paralysis mentioned, one carpopedal spasm of questionable etiology two days after a maxillary sinus operation and tonsillectomy and adenoidectomy, and two headaches lasting two days following administration of morphine and atropine, vinethene and ether.

Blood sugar determinations were made before anesthesia and again at the close of vinethene anesthetics lasting approximately ten minutes or soon after recovery. The Shaffer-Hartmann-Somogyi method of blood sugar determination was employed. Results of this study appear in table 5. Many large children are in this series. Of eleven patients, nine had an increase in blood sugar and two had no appreciable change. These figures suggest that a blood sugar rise comparable to that found with several other anesthetic agents occurs with vinethene anesthesia and that this may be greater in the presence of cyanosis. The values in this series are not alarming. Further work on this subject is indicated and is being undertaken at this time.

SUMMARY

From clinical experience in 2,050 administrations we feel that vinethene anesthesia, particularly for short operations when patients are to be ambulatory soon thereafter, and as an induction agent when indicated, has a definite place in the surgical armamentarium. The

11. Light, Geraldine; Ross, Mary A., and Fulton, Elizabeth: Clinical Experience with Divinyl Ether (Vinethene), *Anesth. & Analg.* 16: 167-170 (May-June) 1937.

simplicity of administration and the infrequency of complications when employed by experienced anesthetists warrant the serious consideration of its use. Vinethene makes an excellent general anesthetic agent for office and outpatient practice; however, as with all anesthetic agents, a suction device and a supply of oxygen and apparatus for its efficient employment should be available. Although no explosions or fires have thus far been reported, precautions must be taken as it is inflammable and explosive.¹² The use of this rapidly acting agent should have its place in war surgery, particularly in areas free from the fire and explosion hazard. Short, painful procedures can be satisfactorily cared for under this agent, and the rapid return to complete consciousness will lessen the postoperative care.

950 East Fifty-Ninth Street.

Clinical Notes, Suggestions and New Instruments

SUBACUTE BACTERIAL ENDOCARDITIS APPARENTLY CURED WITH SULFANILAMIDE

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Spontaneous remissions, frequently of several months' duration, are not unknown in subacute bacterial endocarditis but spontaneous recovery is extremely unusual. Recovery is so rare in fact that "the occurrence of authenticated recovery from bacterial endocarditis is highly questionable" according to Kinsella.¹ Nevertheless a recent review of the literature by Capps² summarized the more authentic cases of recovery. He cited eleven cases he had himself observed with survival for more than five years. However, he had seen no recovery since 1924.

The advent of sulfanilamide in the medical therapeutic armamentarium gave rise to great hopes for successful treatment of this disease. Many disappointments and a few triumphs seem to have resulted as our experiences increase.³ The subject

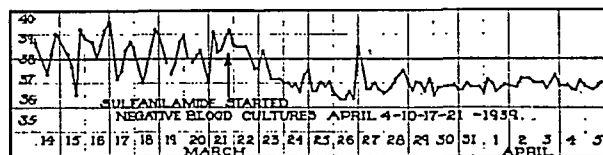
has been evaluated more recently by Spink and Crago,⁴ who reviewed the literature and reported twelve cases of subacute bacterial endocarditis treated with sulfanilamide. In ten cases the ultimate course was unaffected, one was temporarily improved and one patient was well after nine months. They came to the conclusion that the use of sulfanilamide in subacute bacterial endocarditis "is of doubtful value because of the nature of the focus of infection."

More favorable results have been reported by Long and Bliss,⁵ whose extensive experience with the use of the drug has perhaps allowed them to use doses which produce blood levels of free sulfanilamide in excess of that used by other observers. At any rate they report during a two and a half year period the use of sulfanilamide in sixty cases of this disease with five cases "apparently cured." Consequently they believe as the result of their observations that "every patient suffering from subacute bacterial endocarditis should receive intensive therapy with sulfanilamide." It is also their opinion that, "provided the treatment is tolerated, it should be maintained until 'cure' or death results."

On this basis and with these dicta the following case of subacute bacterial endocarditis was treated with gratifying results. It is my purpose in this paper to report this case in sufficient detail to leave no doubt as to the accuracy of the diagnosis with especial emphasis on doses of sulfanilamide used and length of time administered. These points are believed important factors in the apparent good results.

REPORT OF CASE

E. I. M., a white girl aged 17 years, entered the University of California Hospital on Feb. 25, 1939, because of twitching of the arms, legs and hands, fever, hematuria, pallor and loss



Rectal temperature.

12. Jones, G. W., and Beattie, B. B.: Explosive Properties of Divinyl Ether, *Indust. & Engin. Chem.* 26: 557 (May) 1934.

From the Department of Pediatrics, University of California Medical School.

It was Dr. Stanley Louie whose interest and efforts made the case such a complete one to report. Dr. Walter Dolfini referred the patient and made the follow-up reports.

1. Kinsella, R. A.: *Text-Book of Medicine*, edited by R. L. Cecil, ed. 4, Philadelphia, W. B. Saunders Company, 1937, pp. 1103-1106.

2. Capps, J. A.: Subacute Bacterial Endocarditis Due to Streptococcus Viridans with Special Reference to Prognosis, *Ann. Int. Med.* 13: 280-293 (Aug.) 1939.

3. These have been reported by:
Christie, W. B.: Use of Prontosil and Prontylin in Streptococcus Viridans Septicemia with Recovery, *M. Rec.* 146: 489-490 (Dec. 1) 1937.

Major, R. H., and Leger, L. H.: Recovery from Subacute Infectious Endocarditis Following Prontosil Therapy, *J. A. M. A.* 111: 1919-1920 (Nov. 19) 1938.

Colvin, L. T., cited by Long, P. H., and Bliss, Eleanor A.: The Clinical and Experimental Use of Sulfanilamide, Sulfapyridine and Allied Compounds, New York, Macmillan Company, 1939, p. 179.

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Welch, F. E., and Southwood, A. R.: Apparent Cure in a Case of Subacute Bacterial Endocarditis, *M. J. Australia* 1: 392-394 (March 11) 1939.

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Sailer, Seaton: Subacute Endocarditis Treated with Sulfanilamide Resulting in Granulocytopenia and Death, *Am. J. Clin. Path.* 9: 269-278 (May) 1939.

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Manson-Bahr, Philip, and Wood, F. G.: Apparent Cure of Two Cases of Infective Endocarditis by Intravenous Chemotherapy, *Practitioner* 141: 221-226 (Aug.) 1938.

Hussey, H. H.: Probable Bacterial Endocarditis Apparently Cured with Sulfanilamide, *M. Ann. District of Columbia* 6: 275-276 (Sept.) 1937.

Klee, P., and Römer, H.: Prontosil bei Streptokokkenkrankungen, *Deutsche med. Wchnschr.* 61: 253-255 (Feb. 15) 1935.

of 25 pounds (11 Kg.). She had been perfectly well until at 7 years of age she developed severe tonsillitis and twitching of the extremities. A diagnosis of chorea was made and the tonsils and adenoids were removed. The chorea recurred in four months and lasted intermittently for two years. At 9 years of age the patient developed "scarlatina" with a red rash, slight fever, no desquamation, and exacerbation of her chorea. At 11 years of age she again had scarlet fever, this time with desquamation and nephritis, and she was said to have developed heart murmurs at this time. Eight months before entry, at 16 years of age, she developed anorexia, fever, lethargy and vomiting and lost 25 pounds. For the past five or six months she had had red elevated nodules on her arms and legs. For two months prior to entry she was under the care of a private physician who observed a "hectic" fever, progressive anemia, an apical systolic murmur, and red blood cells in the urine. A blood culture taken at the time was negative but she became worse in spite of two blood transfusions. The remainder of the history is noncontributory.

On admission to the hospital the patient appeared poorly nourished and anemic. There were carious teeth. The tonsils were clearly removed. Petechial hemorrhages were found over the lower extremities.

The point of maximum intensity was diffuse in the fifth interspace 9.5 to 10 cm. from the midsternal line. This represented definite enlargement to the left. No thrills were felt. The heart sounds at the apex were accentuated, the second more than the first. There was a loud systolic murmur heard in the mitral area and widely transmitted particularly to the axilla. No diastolic murmur was heard. The rate was rapid. The blood pressure was 101 systolic, 68 diastolic. The spleen was palpable two fingerbreadths below the left costal margin.

4. Spink, W. W., and Crago, F. H.: Evaluation of Sulfanilamide in the Treatment of Patients with Subacute Bacterial Endocarditis, *Arch. Int. Med.* 64: 228-248 (Aug.) 1939.

Blood cultures positive for *Streptococcus viridans* were obtained on February 25 and 28. The same organism was recovered from a urine culture February 27. *Streptococcus viridans* found in blood and urine culture had the following reaction: not bile soluble, acid formation in and coagulation of milk, acid produced in maltose, sucrose, lactose, trehalose, raffinose and salicin. There was no fermentation in inulin, mannite and sorbitol. Blood count revealed hemoglobin 54 per cent, red blood cells 2,740,000, white blood cells 10,100, polymorphonuclears 76 per cent. The icteric index was 30.5. The sedimentation rate was forty minutes for 18 mm. The Addis test revealed specific gravity 1.014, protein 0.5 mg., hyaline casts 60,000, granular casts 120,000, white blood cells 3,500,000 and red blood cells 6,000,000.

The electrocardiogram showed no evidence of myocardial damage or other abnormality, but x-ray examination revealed gross cardiac enlargement to the right and left and particularly marked left auricular dilatation.

At the time of admission the patient had a swinging temperature between 38 and 40 C. (100.4-104 F.). The pulse rate averaged 115. Three days after admission several small red areas over the left ankle were observed. These were tender and left a slight discoloration when they disappeared. No other embolic phenomena were observed.

A diagnosis of subacute bacterial endocarditis superimposed on an old rheumatic mitral valvulitis was made. On March

5,272,000. Urinalysis revealed only a slight trace of albumin. The sedimentation rate was one hour and forty-two minutes for 18 mm.

SUMMARY AND CONCLUSIONS

A case of subacute bacterial endocarditis with chronic foci of infection, chorea, hematuria, petechiae, organic heart murmur, splenomegaly, progressive pallor and weight loss and two blood cultures positive for *Streptococcus viridans* is "cured" apparently. Following large doses of sulfanilamide for fourteen days the patient became afebrile, had four negative blood cultures and showed steady improvement and no remission in a year's observation period.

It is hoped that the early diagnosis of subacute bacterial endocarditis in children and young people treated as energetically as was this patient will have the same outcome.

USE OF QUININE FOR RELIEF OF "NIGHT CRAMPS" IN THE EXTREMITIES

PRELIMINARY REPORT

HAROLD K. MOSS, M.D., AND LOUIS G. HERRMANN, M.D.
CINCINNATI

Painful tonic spasms of muscles in the extremities of middle aged and elderly patients who may show little evidence of serious structural changes of the peripheral blood vessels frequently cause the practicing physician considerable concern. These muscular contractions usually occur while the patient is at rest and are frequently referred to as "night cramps."

On the basis of reports of Wolf and Kennedy¹ regarding the effect of quinine hydrochloride on skeletal muscles in myotonia congenita and in myotonia atrophica, one of us (H. K. M.) administered quinine sulfate to a woman whose suffering from these "night cramps" in both lower extremities was of such intensity that she was afraid to go to bed. The rapid cessation of symptoms prompted a study in a group of patients both with and without evidence of organic changes in the peripheral arteries.

Since March 1939 clinical studies have been conducted in the Vascular Disease Clinic of the Cincinnati General Hospital to determine the effectiveness of quinine therapy on patients who gave a history of "night cramps" of sufficient frequency and intensity that relief could be readily appreciated. Fifteen patients were studied. Improvement to the point of complete cessation of pain was promptly noted within a relatively short period of time, often a matter of hours. Unfortunately it is impossible to create these spasms at will and thus evaluate the effectiveness of the drug under such experimental circumstances. However, many of the patients not only experienced quick relief with medication but repeatedly had exacerbations when the drug was withdrawn or, unknown to them, a placebo capsule was substituted. The following cases are examples:

REPORT OF CASES

CASE 1.—I. W., a woman aged 67 who was suffering from "night cramps," complained on March 23, 1939, of a continuous muscular spasm in the calf of the left leg when she was at rest during the preceding week. Quinine sulfate 3 grains (0.2 Gm.) in capsule form three times a day was prescribed. April 6 she reported that her cramps had disappeared completely within three days after starting the medication and had not returned. In order to establish a minimum therapeutic dose, one 3 grain capsule was prescribed morning and night with continued relief. In April a capsule of the same physical appearance but containing lactose was prescribed. She returned to the clinic one week later because of recurrence of muscle cramps in the extremities. Relief was again experienced with resumption of one 3 grain capsule of quinine sulfate twice a day. In a further attempt to arrive at a minimum dose, one 3 grain capsule was administered only at bedtime. She experienced mild cramps

From the Department of Internal Medicine and the Vascular Disease Clinic of the Department of Surgery and the Cincinnati General Hospital.
1. Wolf, Alexander: Quinine: An Effective Form of Treatment for Myotonia, Arch. Neurol. & Psychiat. 36: 382-383 (Aug.) 1936. Kennedy, Foster, and Wolf, Alexander: Experiments with Quinine and Prostigmine in Treatment of Myotonia and Myasthenia, *ibid.* 37: 68-74 (Jan.) 1937.

Treatment of Patient

E. I. M. (Weight 41.2 Kg.)						
Date	Sulfanilamide		Blood Titer, Mg. %	Hemo-globin, per Cent	Red Blood Cells	White Blood Cells
	Dose/ Kg.	Gm./ 24 Hr.				
3/21/39	0.2	8.0	4	65	3.28	5,800
3/22/39	0.2	8.0	10	..	..	..
3/23/39	0.2	8.0	10	58	2.41	7,450
3/24/39	0.2	8.0	12	..	..	470
3/25/39	0.2	8.0	16	75	3.43	10,800
3/26/39	0.2	8.0	19	..	..	..
3/27/39	0.2	8.0	20	62	3.61	8,900
3/28/39	0.2	8.0	20	..	..	..
3/29/39	0.2	8.0	24	70	2.80	6,000
3/30/39	0.2	8.0	18	72	3.60	7,600
3/31/39	0.2	8.0	20	63	3.50	8,000
4/ 1/39	0.2	8.0	21	..	..	..
4/ 2/39	0.2	8.0	22	73	3.10	8,050
4/ 3/39	0.2	8.0	22	..	..	..
4/ 4/39	0.2	8.0	18	65	2.70	6,000
4/ 5/39	0.2	8.0	18	..	..	350
4/ 6/39	0.2	8.0	21	73	3.59	7,900
4/ 7/39	0.2	8.0	20	..	..	..
4/ 8/39	None	..	20	70	3.30	7,700
4/ 9/39	None	..	10	..	..	..
4/10/39	None	..	5	60	2.60	6,000
4/11/39	None	..	4	..	..	..
4/12/39	None	..	Trace	52	2.60	6,800

21 sulfanilamide was started. The daily dosage was 0.2 Gm. per kilogram of body weight, or 8 Gm. Sodium bicarbonate 4 Gm. daily was given with the sulfanilamide. Fluids were kept to 2,500 cc. daily. In three days the blood titer was 10 mg. per hundred cubic centimeters of free sulfanilamide. The temperature was normal. On the sixth day the blood level was 19 mg. per hundred cubic centimeters. The same dosage for the ensuing two weeks maintained a blood titer of approximately 20 to 24 mg. per hundred cubic centimeters. The patient became very cyanotic, had slurred speech and at times was very garrulous and had mild delusions and hallucinations. She took her fluids well without vomiting and ate well during the entire course of treatment.

Blood cultures taken on April 4, 10, 17 and 21 were all negative and the patient was afebrile for fourteen days without the drug. The toxic manifestations of the medication disappeared and she was discharged from the hospital on April 21, 1939.

Since discharge the patient has made an uneventful recovery. She has gained 40 pounds (18 Kg.) and is afebrile. Her physician reports (Feb. 1, 1940) that at no time has she shown any sign or symptom of recurrence of the infection. The heart murmur persists but there is no enlargement. A recent blood count showed a hemoglobin of 90 per cent and red blood cells

in the foot without involvement of either leg. Quinine sulfate 3 grains twice a day was then considered her minimum effective dose. On three subsequent occasions, in August and November 1939 and March 1940, placebos were substituted. Repeatedly the symptoms recurred and were relieved when quinine sulfate was taken by mouth.

CASE 2.—O. H., a man aged 56, who came to the clinic Nov. 30, 1939, complained of severe cramping in both calves and thighs from three to six times each night. Quinine sulfate 3 grains was prescribed morning and evening with complete relief the first night and only one cramp before his next clinic visit, December 15. Since he had suffered with this discomfort for years and had experienced remissions for a week or more before, he was not convinced that the medication played a part in the improvement. Milder cramps reappeared intermittently and his dose at night was increased to 6 grains (0.4 Gm.), in addition to the 3 grain morning dose, with complete relief. By the end of January 1940 he was enthusiastic, and a placebo was substituted. On February 15 he stated that he had had very mild cramps between the time of his last visit and two nights before his present one when the cramps returned with all their former severity. He was returned to his routine of 3 grains each morning and 6 grains each evening with alleviation of pain. He still occasionally reports mild spasms which he can relieve by stretching without getting out of bed.

CASE 3.—R. B., a man aged 69, had for years experienced muscular contractions of the legs when at rest. Aug. 31, 1939, he stated that he had remained out of bed the entire preceding night because of an immediate return of cramps on lying down. Quinine sulfate 3 grains was prescribed in the morning and at bedtime, with immediate cessation of symptoms the first night. He continued to have relief until November, when, on his failing to keep an appointment, his prescription was not refilled. Marked contractions with pain returned in the absence of medication and disappeared when it was resumed. In January a placebo capsule morning and night was substituted and the "night cramps" reappeared. Again on quinine sulfate therapy he had no complaints when last seen in April 1940.

CASE 4.—D. M., a woman aged 69, had "night cramps" so severe that they recurred every time she returned to bed. She preferred sleeping in a chair. Early in March 1939 a 3 grain quinine sulfate capsule was given after each meal and at bedtime, with prompt and lasting relief until her supply became depleted one month later. The contractions that reappeared were of lesser severity than before. Medication was reinstituted but reduced to two 3 grain capsules daily, with disappearance of cramps and continued benefit. On two subsequent occasions in August and November 1939 her supply again became depleted and the painful contractions reappeared, the second time severely. Instead of reestablishment of quinine therapy at this point, placebo capsules were administered. There was no change in one week. Quinine sulfate then replaced the placebo, with prompt relief. In January 1940 the patient's medication was discontinued and there has been no apparent need of it to date.

COMMENT

Though the relief after medication was consistent in all cases, many of them, in contrast to those described, continued without symptoms when a placebo was substituted or the drug discontinued. Their status was therefore impossible to evaluate. The coexistence of paresthesias and pain of vascular disease did not influence selection of patients provided "night cramps" were present. Intermittent claudication, when present, persisted despite disappearance of tonic contraction of muscles that occurred at rest. The pharmacology of quinine has been adequately discussed by Wolf,¹ Harvey,² Weiss³ and others.⁴

It is thought to act at the myoneural junction and appears to be the pharmacologic antagonist of prostigmine, relieving spasm in the myotonias and increasing the distress of myasthenia gravis.

CONCLUSION

Following the successful use of quinine by Kennedy and Wolf in the rare conditions myotonia congenita and myotonia atrophica, quinine sulfate was administered for relief of the common condition known as "night cramps." Fifteen cases were studied. A beneficial effect was noted in all. In some cases no return of symptoms followed cessation of medication or substitution therapy. A sufficient number, including the four cases reported, showed repeated exacerbations on a placebo and remissions when medication was resumed, indicating the value of the drug in this rather common form of muscular spasm. Further investigation as to the mechanism of action is being pursued.

GRANULOCYTOPENIA FOLLOWING INGESTION OF CAUSALIN

FRANCIS H. McGOVERN, M.D., DANVILLE, VA.

In spite of fairly widespread knowledge that the use of aminopyrine is always fraught with danger, the drug continues to take its toll. This situation is due first to indifference on the part of the physician, secondly to ignorance of the content of proprietary preparations and thirdly to difficulty in adequate legislation. Causalin,¹ a compound composed of equal parts of aminopyrine and hydroxyquinoline, is suggested chiefly for the relief of rheumatism and arthritis. Since the concept of acquired drug sensitivity causing profound reactions of the blood cells and hemopoietic tissues has been proposed, causalin has been repeatedly identified among those drugs which appear to be an etiologic factor in granulocytopenia.

An additional fatal case is here reported of extreme granulocytopenia following the ingestion of large doses of causalin over a period of a month.

REPORT OF CASE

An unmarried woman, aged 34, despite the warnings of her physician, had been taking six capsules of causalin daily over the period of a month. The history of no other medication was obtained. For the past twelve years she has been under the care of various physicians and clinics for a severe disabling chronic atrophic arthritis. She had used the drug the previous year with no apparent harm. The present illness started suddenly thirty-six hours before admission to the Memorial Hospital. She complained of severe sore throat, swelling of her neck, difficulty in swallowing, extreme malaise and high fever.

On admission her temperature was 105.6 F., respiratory rate 22, pulse rate 84. She was rational but appeared extremely toxic. She talked and swallowed with difficulty, owing to the markedly edematous and hyperemic pharyngeal structures. No ulcerations were present in the mouth or pharynx. Externally the neck was swollen but no glands were palpable. There was a chronic purulent otitis media on the left side. The heart, lungs, abdomen and extremities were negative to examination. The laboratory reported 315 white cells per cubic millimeter with no evidence of a granulocyte in the stained smear. The hemoglobin was 75 per cent and the red cell count 3,790,000. She was given Ringer's solution intravenously, with 10 cc. of pentnucleotide every four hours, concentrated liver extract intramuscularly and a 250 cc. blood transfusion late the day of admission. At midnight the white blood count was 500; the granulocytes were completely absent. Twenty hours after admission the patient had a convulsion and died. Postmortem examination was not performed.

COMMENT

The toxicity of aminopyrine contraindicates its use. Unlike sulfanilamide, its dangers overbalance its benefits and should be replaced by other analgesics or antipyretics. All physicians should be acquainted with the drugs incriminated in producing granulocytopenia and other hematologic disturbances.

1. Causalin, distributed by the Amfre Drug Company, New York. The $\frac{7}{16}$ grain (0.5 Gm.) capsules contain aminodimethylpyrazolquinoline sulfonate salicylate carbonate.

2. Harvey, A. M.: The Mechanism of Action of Quinine in Myotonia and Myasthenia. *J. A. M. A.* 112:1562 (April 22) 1939.

3. Weiss, Soma: The Action of Atropine, Quinine, Quinidine, and Quabain on the Fibrillation of Skeletal Muscles. *Proc. Soc. Exper. Biol. & Med.* 23:567, 1926.

4. Santesson, C. G.: Ueber den Einfluss einiger China-Alkaloide auf die Leistungsfähigkeit der kalthäuter Muskeln. *Arch. f. exper. Pharmacol.* 30:411, 1892. Bri-coc, G.: Quinine in Myotonia Congenita: Its Antagonism to Prostigmine. *Lancet* 1:1151-1152 (May 20) 1939. Koll, L. C., Harvey, A. M., and Whitehill, M. R.: A Clinical Study of Myotonic Dystrophy and Myotonia Congenita with Special Reference to the Therapeutic Effect of Quinine. *Bull. Johns Hopkins Hosp.* 62:188 (March) 1938.

ULCEROGLANDULAR AND PULMONARY TULAREMIA
TREATED WITH SULFANILAMIDE

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This case of ulceroglandular and pulmonary tularemia is reported for several reasons which make it of unusual interest, one of which is the fact that sulfanilamide was administered.

A youth aged 20, a farmer and miner, while hunting, Nov. 1, 1939, shot a chicken hawk which was feeding on a dead rabbit. He picked the hawk up when it was not quite dead and it pecked him on the third finger of the right hand. He did not touch the rabbit. The wound did not bleed. In three days the finger became swollen and a localized abscess was opened by his home physician. A chronic ulcer appeared at this site which in the next two months eventually healed. In January 1940 a swelling appeared in the right axilla which was progressive but never painful; fever was present, a loss of weight from 159 to 127 pounds (72 to 57.6 Kg.) occurred and a constant nonproductive cough appeared. There were no chills. The wound in the finger broke down several times but eventually healed, leaving a depressed firm scar.

The patient was sent by Dr. Lee Martin of Burgettstown, Pa., to the Mercy Hospital in Pittsburgh on April 18. At this time his temperature was 101.6 F., the white blood cells numbered 14,700 and the hemoglobin was 68 per cent (Haden-Hauser). The rest of his story was not significant. The urine was essentially normal. Physical examination showed the healed ulcer in the third finger of the right hand and a large fluctuant mass in the right axilla measuring about 10 cm. in diameter. The patient looked chronically ill and coughed constantly. There was considerable dyspnea necessitating elevation of the head of the bed. Examination of the chest showed absence of breath and vocal sounds in the left lung field, from the level of the eighth rib downward in the axilla and higher posteriorly. The percussion note was flat. Examination otherwise was essentially negative. Aspiration by needle of the axillary mass produced about 8 cc. of turbid yellow fluid which on culture was sterile both for ordinary organisms and on culture for tubercle bacilli. X-ray examination of the chest on April 19 showed extensive consolidation of the left lower lobe together with a small area of infiltration in the right lower lobe. By thoracentesis on April 23 250 cc. of greenish yellow fluid was obtained for diagnosis. It was evident that a great deal more fluid was present. Repeated blood cultures showed no growth. Culture of the pleural fluid showed *Pasteurella tularensis*. A macroscopic agglutination test for *Pasteurella tularensis* was positive on April 19 at 1:160 and on April 24 at 1:80. Sputum showed only an occasional hemolytic streptococcus and mixed oral bacteria. *Diplococcus pneumoniae* and *Pasteurella tularensis* were not isolated from the sputum.

Sulfanilamide, 1 Gm. every three hours, was begun on April 18 and continued in decreasing doses until, on April 26, a total of 36 Gm. had been given. The temperature within three days of admission had dropped to normal and remained so with slight variations. Forty-eight hours after all sulfanilamide had been discontinued, that is on April 28, there was a transient rise in temperature to 101 F., which disappeared spontaneously without further medication on April 30.

The patient was sent home without further aspiration May 12 weighing 133 pounds (60 Kg.), a gain of 6 pounds (2.7 Kg.) during his hospital stay, and having had a normal temperature for twelve days. He was seen June 17, at which time there was still dullness to percussion over the left side of the chest, but stereoscopic roentgenograms showed no evidence of fluid and almost total clearing of the lung fields. Fluoroscopic examination in various positions showed no restrictions in the movements of the diaphragm. The patient had gained 25 pounds (11 Kg.) in the month since discharge, was free from fever and was clinically well, and the right axilla showed only a small, firm, deep area of induration about the size of a pea.

COMMENT

The points of especial interest here are three: (1) the unusual way in which the disease was contracted, (2) the unusual length of time from infection until the appearance of pulmonary disease and the relative chronicity of the pulmonary lesion and (3) the possible influence of treatment. It is not unlikely that

the patient was seen at a time when spontaneous defervescence was about to occur. Nevertheless, rapid clinical improvement ensued immediately following the use of sulfanilamide. During the subsequent rise in fever the drug was purposely withheld, in spite of which a prompt drop to normal occurred. One cannot know whether sulfanilamide was of value or not. One point supporting the idea that some benefit was derived is the fact that while *Pasteurella tularensis*, a pyogenic organism, was recovered from the pleural fluid, empyema did not occur.

Therapeutically another question arose: whether to evacuate the pleural fluid or to allow it to remain. Because of the chronic nature of the pulmonary process, the known beneficial effect of allowing pleural effusion to remain in the chest in tuberculosis, and the continued absence of clinical signs of empyematous change, only the diagnostic thoracentesis was done. I believe that the good end result justified the reasoning here.

SUMMARY

A case of ulceroglandular and pulmonary tularemia exhibited several unusual features and several problems in therapy. Whether or not sulfanilamide influenced the clinical course is open to question. I am of the opinion, however, that the pleural effusion was a beneficial phenomenon and that, under similar circumstances, it should be left in situ as long as evidences of pleural suppuration do not occur.

4715 Fifth Avenue.

Special Clinical Article

PERITONITIS AND APPENDICITIS

CLINICAL LECTURE AT NEW YORK SESSION

ERWIN R. SCHMIDT, M.D.

MADISON, WIS.

John of Arderne¹ in 1370 wrote treatises on "passio iliaca" (either appendicitis or intestinal obstruction). Fernel² in his book *Universa Medicina* published in 1554 described a case of acute appendicitis with perforation. Laurence Heister³ described an abscess in the vermiform process of the cecum in his book *Medical, Chirurgical and Anatomical Cases and Observations* translated by George Wirgman in 1755. In 1757 M. Mestivier² reported on "Observations on a Tumor Near the Umbilical Region on the Right Side Produced by a Large Pin Found in the Vermiform Appendix of the Cecum." In his *Lectures on the Morbid Anatomy of the Serous and Mucous Membranes*, published in 1836, Thomas Hodgkins² says:

The partial inflammation of the peritoneum in the iliac fossa is sometimes set up by disease in the appendix caeci. If this be inconsiderable, it may merely give rise to some very limited partial adhesions; at other times, the appendix having been perforated by ulcerations, occasioned by the lodgment of the fecal concretions in its cavity, extravasation takes place, and inflammation of a more severe and serious kind is originated. Even in these cases nature sometimes succeeds in limiting the inflammation to a part of the right side; but it is at other times diffused over the whole abdomen, is accompanied by symptoms of the most serious nature, and quickly proves fatal.

In 1886 Reginald H. Fitz² in the *Boston Medical and Surgical Journal* in a paper entitled "Perforating Inflammation of the Vermiform Appendix with Special Reference to Its Early Diagnosis and Treatment" felt

From the Department of Surgery, University of Wisconsin Medical School.

Read in the Surgical Division of the General Scientific Meetings at the Ninety-First Annual Session of the American Medical Association, New York, June 11, 1940.

1. Garrison, F. H.: *An Introduction to the History of Medicine*, Philadelphia and London, W. B. Saunders Company, pp. 148-149.

2. Major, R. H.: *Classic Descriptions of Disease*, Springfield, Ill., and Baltimore, Charles C. Thomas, 1932.

that pathology in the appendix was the primary disease in what was commonly called typhlitis, perityphlitis and perityphlitic abscess. His paper could have been written today. Three fifths of the cases showed a fecal concretion as the local cause. Termination by resolution occurred in one third of the cases of typhlitis and perityphlitis. The chief source of danger in the peritonitis was its spread, and more than two thirds of the patients died in the first eight days. Recommended were opium treatment, rest and liquid diet in small quantities frequently repeated. The abscess was opened sometimes as early as the fifth day, usually later. Forty-seven per cent were operated on in the second week and 26 per cent after the third week. In the *Quarterly Cumulative Index Medicus* for 1936 there are 500 papers listed.³

The subject has occupied medical attention for many years. There is still no agreement. Orr⁴ says "Unfortunately a unanimity of opinion does not exist among surgeons concerning the operative and nonoperative treatment of peritonitis due to appendicitis." The discussions, papers, research and clinical experience still leave the subject unsettled in general, yet most individuals feel that their method is the best. The incidence of deaths due to appendicitis per hundred thousand has been steadily increasing in the United States. In the *Spectator* for Aug. 3, 1933, a table of deaths from appendicitis is shown covering the years 1910 to 1932 inclusive from sixty cities. It began with 13.3 per hundred thousand, reached 18 in 1929 and 1930 and in 1932 was 15.7. Individual cities went as high as 46.9 per hundred thousand and some other cities were as low as 1.5 per hundred thousand. The *Spectator* of Aug. 27, 1931, shows a mortality of 59 per hundred thousand in one city for the year 1930. Comparing these figures in the same paper, in 1929 Korea had 1.9, Cairo 3.1, Singapore 3.1, Port of Spain 7.4 and San Juan 5.4 per hundred thousand; England and Wales 7.1, Scotland 10, Irish Free State 5.2, Northern Ireland 5.2, New Zealand 7.2 and the city of Mexico 9.3. These are very interesting statistics.

The problem of appendicitis and peritonitis can be simplified by briefly discussing those aspects about which there is some agreement. Later we can turn our attention to controversial points. In general, an acute appendicitis in which the pathologic condition is in the appendix should be operated on. There will be a varying mortality because of:

1. Difficulty in making an accurate diagnosis. (In a series of 330 cases of acute appendicitis,⁵ acute appendicitis with abscess and acute appendicitis with perforation, we were correct in 76.9 per cent of the acute cases, 76.19 per cent of the cases with abscess and 90.625 per cent of the cases with perforation.)
2. Difference in severity due to type of organism. (Streptococcal infection is much more serious.)
3. The fact that every series of surgical cases has a mortality rate just due to the surgery, independent of the pathologic condition. (The cases should be listed by the type of pathologic change found and not by the preoperative diagnosis. Many a chronic or subacute case will creep into the series and improve the results, or cases with a pathologic condition outside the appendix will be included and give a higher mortality.)

The conditions mistaken for acute appendicitis are numerous. An analysis of the 330 cases mentioned shows that in 277 cases of acute appendicitis the clini-

cians agree with the pathologists in 76.9 per cent. In sixty-one cases classified as incorrect there was essential agreement, leaving only two cases, or 0.72 per cent, of error. In twenty-one cases with abscess, four cases were diagnosed at operation, an error of 22.81 per cent. Of the cases in which there was perforation, 90.625 per cent were correct. In fifty-three cases diagnosed as acute appendicitis, the pathologist on microscopic examination made a diagnosis of chronic appendicitis. Eight cases diagnosed as chronic proved to be acute. In one case a normal appendix was found. One case diagnosed as chronic inflammatory pelvic disease showed an acute appendicitis at operation. Other conditions that may cause mistaken diagnoses are meningitis, encephalitis, pneumonia, tabetic crises, pylorospasm, nonspecific ileitis, renal calculi, Dietl's crisis, lymphadenitis, spastic colon, cystic ovary, pelvic inflammatory disease, ectopic pregnancy, seminal vesiculitis, psoriasis and psoas abscess (Long's abscess), diverticulum of the bladder, strain of the abdominal muscles, hematoma of the abdominal muscles and Meckel's diverticulum.

Recognizing that the material discussed should be the same and human fallibility be eliminated as much as possible, the pathologic diagnosis should be as near

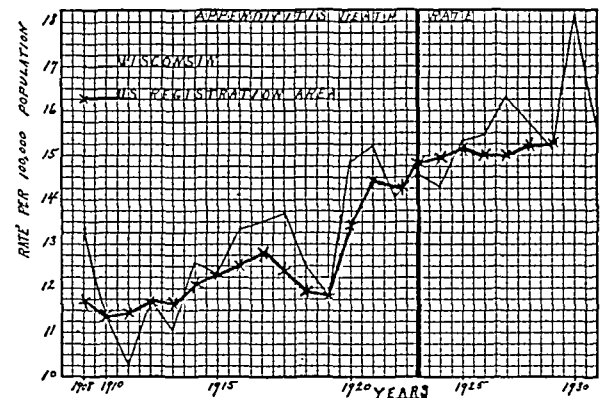


Fig. 1.—Appendicitis death rate (reprinted from Taylor, A. C., and Schmidt, E. R.: *Acute Appendicitis*, Internat. S. Digest 17: 195 [April] 1934).

perfect as we can make it. A simple classification would be as given in table 4.

In order to compare results, care should be exercised to select the cases pathologically so that the material in different series is the same. This would eliminate the great variation. The bacteriology is extremely difficult. Culture, isolation and identification of organisms require an expert bacteriologist. In most severe cases the bacteria present are multiple, while recovery usually occurs in those with a single infecting organism (Curreri, Wangenstein). The role of the gas forming organisms is difficult to interpret. From the bacteriology the clinical course cannot be foretold.

In considering an inflammation, its course is governed by definite factors: The dosage of the organism, the virulence of the organism and the resistance of the host. It will either clear up, progress and cause suppuration with later healing, or progress will lead to suppuration, extension to the blood stream, and death of the host. In a boil no one would consider cutting it before suppuration had taken place and nature built a wall of defense. A cellulitis is treated conservatively until it heals or suppuration takes place when it is incised and drained. An ulcer of the stomach is given rest; gastroenteritis is also treated with rest. A generally recognized surgical principle in many parts of the body is

3. Schmidt, E. R., and Joachim, F. G.: The Student Health Problem of Appendicitis, *Journal Lancet* 58: 329 (July) 1938.

4. Orr, T. G.: Treatment of Peritonitis, *J. A. M. A.* 113:1489 (Oct. 14) 1939.

5. Carney and Schroeder: Acute Appendicitis—A Statistical Study. Thesis for Degree of M.D.

to aid nature by enhancing the resistance, both local and general, of the host. A surgical procedure reduces the local and general resistance through dehydration and the production of a mild acidosis. This can be seen in respiratory complications following a general anes-

TABLE 1.—Death Rate from Appendicitis in Twenty-Five Cities of More Than 300,000 Population, 1930

City	Population	Deaths	Death Rate per 100,000
Philadelphia.....	1,953,423	282	14.4
Portland, Ore.....	303,606	44	14.5
Seattle.....	366,552	54	14.7
San Francisco.....	636,866	96	15.1
Indianapolis.....	365,130	56	15.3
Los Angeles.....	1,250,857	191	15.3
Jersey City, N. J.....	317,254	50	15.8
Rochester, N. Y.....	328,762	52	15.8
New York.....	6,991,957	1,110	15.9
Pittsburgh.....	701,974	115	16.4
Cleveland.....	902,450	155	17.2
Baltimore.....	806,297	147	18.2
Chicago.....	3,389,508	618	18.2
Detroit.....	1,576,124	295	18.7
Louisville, Ky.....	308,843	68	18.8
Buffalo.....	575,088	112	19.5
Washington, D. C.....	487,824	98	20.1
Milwaukee.....	580,596	119	20.5
St. Louis.....	822,909	175	21.3
Boston.....	781,838	168	21.5
Newark, N. J.....	442,874	100	22.6
New Orleans.....	460,152	106	23.0
Minneapolis.....	465,979	108	23.3
Cincinnati.....	452,130	109	24.1
Kansas City, Mo.....	401,207	106	26.4
Totals.....	25,670,190	4,524	17.63

Reprinted from the Monthly Bulletin of the Department of Public Health, City of Philadelphia, December 1932.

thesia or even in spinal anesthesia. The local trauma of an operation reduces the local resistance. Experimentally in dogs conservative treatment gave a 29 per

TABLE 2.—Appendicitis in Twenty-Eight Hospitals

Hospital Number	Number of Cases	Number of Clean Cases	Number of Peritonitis Cases	Per Cent of Local Peritonitis	Per Cent of Spreading Peritonitis	Per Cent of Mortality
1	100	52	48	58.33	41.67	0
2	100	80	20	55	45	0
3	32	28	4	75	25	0
4	71	60	11	45.45	54.55	1.41
5	196	128	68	56.52	43.48	1.53
6	183	112	71	71.53	28.17	1.64
7	60	42	18	50	50	1.67
8	57	33	24	62.50	37.50	1.75
9	84	65	19	84.21	15.79	2.38
10	138	92	46	67.39	32.61	2.90
11	146	122	24	25	75	3.42
12	56	37	19	57.89	42.11	3.57
13	126	95	31	45.39	54.61	3.97
14	93	71	22	40.91	59.09	4.30
15	135	88	47	63.83	36.17	4.41
16	104	77	27	48.15	51.85	4.80
17	187	124	63	44.44	55.56	4.81
18	20	12	8	87.50	12.50	5
19	59	34	25	56	44	5.08
20	96	56	40	60	40	5.20
21	19	12	7	71.43	28.57	5.26
22	236	144	92	54.35	45.65	6.36
23	152	89	63	53.97	46.03	6.68
24	249	163	86	45.35	54.65	6.82
25	100	80	20	57.76	42.24	6.88
26	217	100	117	57.26	42.74	7.37
27	35	14	21	47.02	52.98	11.43
28	31	19	12	66.67	33.33	12.90
Totals	3,142	2,038	1,104	54.34	45.66	4.39

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cent mortality while surgery gave 52 per cent, and operation and drainage more than doubled the amount of adhesions.⁶ These facts are generally accepted among surgeons.

Experimentally, a closed loop of intestine distends. A clinical example is found in intestinal obstruction.

6. Schmidt, E. R., and Taylor, A. C.: Acute Appendicitis in Dogs, Arch. Surg. 35: 65-70 (July) 1935.

With distention an anemia of the mucous membrane occurs. Reduced blood supply lowers resistance and permits an otherwise mildly virulent or common inhabitant of the mucous membrane to start the vicious cycle of inflammation. Wangenstein⁷ has shown that obstruction of the lumen is a factor in producing the inflammation. Hodgkins² and the very early writers² showed that fecaliths occurred in three fifths of the cases. What happens afterward depends on the local and general resistance of the patient.

One hundred per cent fatal peritonitis can be produced in dogs only if an opening 1 cm. long is made in the ileum several centimeters away from the ileocecal junction. Wangenstein⁷ has shown this, and Curreri⁸ in our laboratory has recently shown the same. Of fifteen dogs with such a peritonitis, fourteen died. The one dog that lived showed at laparotomy a complete closure of the opening by adhesions to adjacent loops of bowels and omentum. By means of Coli-Bactragen injected intraperitoneally before the bowel was opened, all the dogs lived. The later it is given after the bowel is opened, the less effective it is. Curreri⁸ used azosulfamide in sixteen dogs immediately after the ileum was opened and four dogs died—a mortality of 25 per cent.

TABLE 3.—Mortality of Peritonitis

	Year	Number of Cases	Deaths	Per Cent
Spreading peritonitis	1928-1929.....	698	237	33.95
	1930.....	472	124	26.27
	1931.....	491	120	24.44
		1,661	481	28.96
Local peritonitis	1928-1929.....	1,502	57	3.79
	1930.....	625	11	1.76
	1931.....	618	10	1.62
		2,745	78	2.84

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From this brief description clinically it is recognized that dosage and virulence of organisms with the resistance of the host are the factors determining the course of inflammation in various parts of the body. Experimentally lowered resistance of the mucous membrane initiates the inflammatory lesion of the appendix. To all intent and purpose these same factors work here. In other parts of the body attempts are made to aid nature to wall off the process. In the case of peritonitis from an appendicitis there are differences of opinion which may be considered as the radical forms, or the conservative with modifications as to the time of surgery.

It can be seen how complicated this subject has become. The variables are many: The surgeon and his judgment, the patient with all the factors that influence him, the virulence of the organism, the resistance, local and general, giving different pathologic conditions, produce innumerable combinations and possibilities which account for the great variation in the literature. The gradual increase in the mortality rate indicates that there is something wrong in the management of these variables.

In the management of 1,715 cases of acute appendicitis at the Wisconsin General Hospital and the Student

7. Bergh, G. S.; Bowers, W. F., and Wangenstein, O. H.: Perforation of Gastrointestinal Tract: An Experimental Study of Factors Influencing the Development of Peritonitis, Surgery 2: 196 (Aug.) 1937.
8. Curreri, A. R., and others: Results in Treatment of Experimental Peritonitis, to be published.

Infirmary of the University of Wisconsin, I want to point out some of our difficulties. In 806 cases of acute appendicitis diagnosed clinically at the Student Infirmary from 1924 to include 1939 there were no deaths; 2.4 per cent were ruptured. Operations were performed in 52 per cent; the remainder of the students were treated conservatively, sent back to their classes and advised to have an interval operation. Seventy-five per cent had symptoms less than twenty-four hours, and 90 per cent were between 18 and 22 years of age. Self medication was negligible.

In the Wisconsin General Hospital during this same time we had 909 cases diagnosed clinically as appendicitis in its various forms. Thirty-one per cent of the patients were over 30 or under 10 years of age. Only 55 per cent had symptoms less than twenty-four hours. Self medication was resorted to in 21 per cent of the cases, and 21.1 per cent were ruptured. In the uncom-

patients were operated on with a mortality of 17.4 per cent. Because we treat cases of rupture conservatively, many of these cases are very early cases of perforation with peritonitis—cases in which we considered the pathologic condition inside the appendix.

TABLE 4.—Classification of Appendicitis

1. Appendicitis with pathologic change in the appendix:
(a) Acute
(b) Subacute
(c) Healed
2. Appendicitis with pathologic change outside the appendix:
(a) Local peritonitis and cellulitis of cecum or mesentery
(b) Early spreading cellulitis
(c) General peritonitis
(d) Complications—early
(1) Rost abscess
(2) Pylephlebitis
(3) Subdiaphragmatic abscess
(4) Septicemia and pyemia
(e) Complications—late
(1) Adhesions
(2) Obstruction
(3) Sinuses
(4) Hernia
(5) Amyloid degeneration

The duration of the symptoms and the relation to the mortality show symptoms longer than twenty-four hours in only 34 per cent of the uncomplicated cases, 76 per cent of the rupture cases and 83 per cent of the fatal cases. The longer the symptoms had been present, the greater the percentage of ruptured appendixes. So, if the symptoms had lasted seven days, 65 per cent had ruptured.

Old persons and infants show a high mortality rate. From the first decade of life our mortality rate was 57.5 per cent; from 50 to 60, 56 per cent, and from 60 to 70, 66.5 per cent. In the student series where the greatest number, 90 per cent, were between 18 and 22 years, there was no mortality.

The last fourteen cases of ruptured appendixes were treated conservatively as usual, but in addition sulfanilamide was employed. Only one patient died, giving a death rate of 7.1 per cent, whereas the death rate was 19 per cent in all our previous cases.

In an analysis of 221 cases treated from 1937 to 1939 there were six deaths. In all of them appendixes were ruptured on admission, and the symptoms had been present on an average of three days. The causes of death were toxemia of general peritonitis three,



Fig. 2.—Section of appendix under low power.

plicated cases the mortality rate was 1.2 per cent, in the ruptured cases 19 per cent, giving a general mortality of 4.9 per cent.

In the Wisconsin General series 21.1 per cent were ruptured, 10.7 per cent showed a local or general peritonitis and 10.4 per cent abscess. Of the infirmary cases, 2.4 per cent were ruptured.

The self medication which plays such a prominent part in producing mortality was interesting. In 43.5 per cent of the rupture cases a laxative was taken, while rupture occurred in only 21 per cent of the untreated cases. The rupture cases with medication showed a mortality of 56 per cent, while all the rupture cases showed a mortality of 19 per cent. The cases of acute appendicitis in which laxatives were taken showed a mortality of 10 per cent, while the mortality in the whole series was 4.9 per cent. There were no deaths in the acute cases in which there was no perforation.

There were 192 cases of ruptured appendicitis in this series. Ninety-four cases were treated conservatively with a mortality of 20.5 per cent. This group includes several patients brought in moribund. Ninety-eight

TABLE 5.—Causes of Death

	Number
General peritonitis.....	23
	1
	3
	1
	3
Empyema.....	2
Subdiaphragmatic abscess.....	2
Pyemia.....	2
	2
	2
Paralytic ileus.....	1
Massive collapse of the lungs.....	1
Carcinoma.....	1
Bronchopneumonia.....	1

thrombosis and embolism two, bilateral bronchopneumonia with effusion one. Four of these patients were operated on and two treated conservatively. Three patients were under 10 years of age and two over 50. Four of these patients were purged enthusiastically—two at the instigation of the family physician. One patient received chiropractic adjustments for four days prior to admission.

The causes of death in the whole general series are given in table 5.

Generally, one may say that appendicitis has been with us a long time. The mortality rate is increasing and needs the serious attention of the medical profession. The difference in the incidence between the various countries is extremely interesting and deserves serious thought and investigation. Certain data are generally accepted. An acutely inflamed appendix with the pathologic condition inside should be removed surgically. The diagnosis is not easy. The fundamental principles of inflammation which are applied in many parts of the body in the clinical management apply in the peritoneal cavity and the appendix. In order to compare results, the same type of cases, pathologically speaking, should be used. A simple classification is given. The mortality rate should not be the only yardstick in measuring the success or failure of a method, but the morbidity which follows should be included. The combination of mortality and morbidity serving as a method of measuring results will guide each individual as to the best method in his own particular case. Statistics are not obtained by wishful thinking, and memory is often convenient but very inaccurate and confusing.

In our series the analysis shows some of our problems. In 1,715 cases we had a mortality of 4.9 per cent. In the rupture cases it was 19.0 per cent, in the unruptured 1.2 per cent. In 806 students with 2.4 per cent of rupture cases there was no mortality. They came in early and were healthy young adults under careful medical care, so that 48 per cent were returned to classes in a short time. The very young and the aged do not stand infection very well. Laxatives are very serious and increase the mortality rate 400 per cent over the general rate and 300 per cent over cases of rupture in which laxatives are not used. The longer the symptoms are present, the greater the percentage of rupture cases. Chemotherapy both from clinical as well as from experimental evidence offers a great help. The mortality rate is due to infection and its sequelae and associated pathologic conditions present before the appendicitis.

From this it develops that the medical profession needs to do certain things from the medical point of view and for the laymen:

For the medical profession:

1. Stop the use of laxatives in the treatment of a possible appendical infection.
2. Recognize the lessons inflammation has taught us in other parts of the body and apply these to the appendix and peritonitis.
3. Be accurate in describing the pathologic condition and bacteria, so that comparisons may be made of methods and results.
4. Recognize the morbidity as represented by late complications as a part of the yardstick in evaluating results.

For the laity:

1. Conduct a campaign in the lay press by the local, state and national medical societies to teach that:

(a) Pain in the abdomen should not be treated by laxatives.

(b) Where the pain persists for an hour, medical attention is needed.

2. An effort should be made by the medical societies such as was done in Philadelphia to get the drug stores and pharmacists to aid in this campaign.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING REPORTS. HOWARD A. CARTER, Secretary.

MOORADIAN SHORT WAVE UNIT, MODEL C, ACCEPTABLE

Manufacturer: Mooradian High Frequency Laboratories, 137 Park Place, Bogota, N. J.

The Mooradian Short Wave Unit, Model C, is said to provide currents for the following therapeutic and surgical procedures: short wave diathermy applied by pad electrodes, spaced pad electrodes, cuff electrodes, electromagnetic induction cable, and diathermy applied internally by means of metal orificial electrodes; electrosurgery, fulguration and electrocoagulation, both monoterminal and biterminal. The unit is housed in a two piece walnut cabinet, the upper part containing the short wave generator and the lower providing storage space for the accessories which are supplied with the unit. The apparatus has an output of 300 watts at 15 meters and an input of 794 watts.



Mooradian Short Wave Unit, Model C

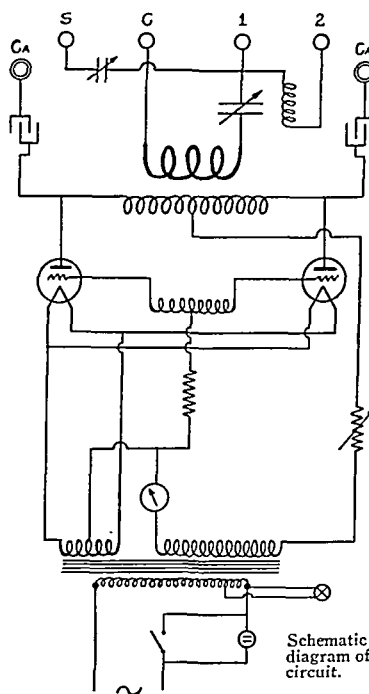
The output current for pads and cuffs is obtained from three terminals composed of a common terminal and two others; the choice of these terminals is determined by the spacing used. This duplex circuit feature together with a wide range tuning control is said to provide a flexible range of control with or without spacing.

Separate terminals and control are used for the electromagnetic induction cable.

The output terminals of the surgical circuit are inductively and capacitatively coupled to the main tank or oscillating circuit. A separate vernier condenser control is used in conjunction with the main tuning control to provide regulation of the surgical current. The tubes consist of two 311-T oscillator tubes.

Evidence submitted by the firm concerning deep tissue heating measurements was confirmed by the Council's investigation.

The Council's clinical investigation of the unit revealed that the unit gave satisfactory clinical service.



Cuffs

Technic: Cuff lengths, $19\frac{3}{4}$ inches. Cuff width, $2\frac{3}{4}$ inches. Average distance between cuffs, 7 inches. Average spacing under cuffs, three-fourths inch. Average thigh circumference, $19\frac{1}{2}$ inches. Average room temperature, 74 F. Average room humidity, 43 per cent.

Average Temperatures of Six Tests

	Cutaneous	Subcutaneous	Intramuscular	Rectal
Initial	91.86	94.83	99.36	99.7
Final	97.3	102.68	105.26	99.73

Coil

Technic: Four turns. Space between turns, $1\frac{3}{4}$ inches. Average thigh circumference, $19\frac{3}{4}$ inches. Average room temperature, 73 F. Average room humidity, 41 per cent.

Average Temperatures of Six Tests

	Cutaneous	Subcutaneous	Intramuscular	Rectal
Initial	91.03	93.65	99.35	99.86
Final	98.88	104.38	107.33	99.86

The Council voted to accept the Mooradian Short Wave Unit, Model C, for inclusion on its list of accepted devices.

HYPERTHERM FEVER CABINET ACCEPTABLE

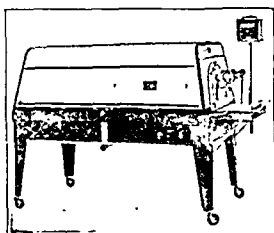
Manufacturer: The Liebel-Flarsheim Company, 303 West Third Street, Cincinnati.

The purpose of the hypertherm is to produce and maintain artificial fever. The firm asserts that the apparatus is designed to operate completely by controlled, warmed, humidified air which circulates throughout the patient compartment.

The cabinet is said to be constructed of corrosion-proof metals; the cabinet proper is 72 inches long, 34 inches wide and 57 inches high. The head bracket is 12 inches long and 21 inches wide, and it supports a drain pan and pillow rest. The entire unit is mounted on casters. The upper part of the apparatus, or the hood which encloses the patient chamber, is constructed of aluminum, air insulated and supported with galvanized steel framework; this hood is hinged and counter-balanced for one-hand operation. A sponge rubber collar seals the opening in the hood for the head, and a towel rack permits towels to be conveniently draped around the patient's neck to reduce heat and humidity loss. Two large sliding doors, 11 inches by 22 inches, are placed on each side of the hood. For checking actual temperature, one door is designed for motion in a forward direction and gives a small opening. For full vision, inspection and quick cooling, the doors are moved toward the foot of the cabinet. Latches on each door prevent the patient from opening them on the inside. The patient compartment is illuminated during treatment, and a window in the head portion of the hood permits observation of the patient.

A hair mattress, the top of which is 36 inches from the floor, is placed on the table or lower portion of the apparatus and is covered with rubber sheeting.

The air conditioning system is mounted under the mattress framework; the mechanism consists of a large steam generating humidifier, a mixing fan and a small air heater. Air is circulated in this lower portion and is allowed to rise into the patient compartment by natural circulation. A simple thermostatic dry bulb control is used for selecting the temperatures desired in the cabinet and controls both the humidifier and the air heater, maintaining saturated conditions at all times. A main switch controls the entire unit. Water is supplied to the humidifier by means of a gallon bottle inverted on a feeder supply which keeps the level of the water constant in the humidifier and at the same time provides a visible gage of available water.



Hypertherm Fever Cabinet.

The firm states that a long series of wet and dry bulb tests over a full range of cabinet temperatures used showed a relative humidity of from 95 to 100 per cent. The energy input is a maximum of 14.5 amperes at 115 volts.

Two safety rubber-bladed fans are placed on brackets at the head of the cabinet. The fans are placed so that they will provide circulation over the patient's head during treatment; one can be placed to blow through the side door across the patient's body if an emergency arises. The head pan facilitates the use of iced cloths or ice on the face.

The rectal indicating thermometer is supplied as an integral part of the equipment and can be used throughout the treatment. This indicating instrument has a scale range of 90 to 110 F. and is equipped with a mirror for more accurate readings. Three standard 1½ volt dry cell batteries are used in series to supply the electric current for operating the mechanism. Switches and mechanism for adjusting the meter to zero, balancing the voltages and standardizing the calibration are readily accessible and plainly marked. The rectal applicator will retain its position throughout the duration of the treatment. The indicating instrument and rectal applicator permit all rectal bulbs to be interchangeable.

The firm submitted fifteen copies of charts made during treatments. Twelve of these show the induction period necessary on twelve patients; the other three show the constancy with which a patient's temperature might be maintained.

In the Council's clinical investigation, the Liebel-Flarsheim Hypertherm Fever Cabinet was used in a clinic acceptable to the Council for several months and was found to give satisfactory service. The temperatures of patients may be elevated to needed levels with reasonable safety and good control. Constant checks by means of a rectal thermometer proved the electric rectal indicating thermometer to be accurate.

The Council voted to accept the hypertherm for inclusion on its list of accepted devices.

Council on Pharmacy and Chemistry

PRELIMINARY REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING
PRELIMINARY REPORT. PAUL NICHOLAS LEECH, Secretary.

CALCIUM MANDEATE AND CALCIUM MANDEATE-MALLINCKRODT CHEMICAL WORKS

Calcium mandelate has been presented for the Council's consideration by the Mallinckrodt Chemical Works as a form of mandelic acid therapy for urinary infections. It is claimed that this preparation is as efficient as the sodium or ammonium salts which are included in New and Nonofficial Remedies. The advantages claimed for calcium mandelate are (1) that it appears from present clinical evidence to be less likely to induce nausea, vomiting or other forms of gastric distress and (2) that it is tasteless.

Calcium mandelate was first used in the clinic by Schnohr,¹ who was gratified with the results which he obtained. According to Schnohr, this compound is broken down in the stomach to calcium chloride and mandelic acid. The calcium is excreted as an insoluble salt in the feces, while the free mandelic acid is excreted in the urine. The acidifying action of calcium mandelate is not as great as that of ammonium mandelate, but it produces a sufficient drop in pH to make the therapy effective. In Schnohr's experience doses of from 6 to 12 Gm. daily were well tolerated and urinary infections in eight cases were cleared as satisfactorily as with any other form of mandelic acid therapy.

These results were confirmed by Melton and Rosenheim.² In their series of thirty-two cases the urine became strongly acid within a short time, only four requiring additional acid therapy. The clinical results were considered to compare favorably with those obtained with sodium or ammonium mandelate. The calcium salt was more pleasant to take and without significant disagreeable effects.

Droller³ observed that the urine became acid about eight minutes after administration of calcium mandelate in thirty-one cases. No toxic symptoms developed and the clinical results were satisfactory.

Cailleux⁴ believes that the calcium and ammonium salts are equally effective and that such therapy is most excellent for urinary tract infections.

In the Council's discussion of this preparation, question was raised as to whether this product might cause any disturbance in the calcium level in the blood stream. It was concluded that this question could be answered only by extensive metabolic experiments. A further question was raised as to whether, in the use of calcium mandelate, the mandelate concentration in the urine is comparable to that when other solutions have been used. It was concluded that this point has not been definitely proved. The Council felt it not unlikely that calcium mandelate may be as effective therapeutically as other salts. However, in the absence of convincing clinical evidence on the points raised the Council voted to hold in abeyance the consideration of the drug and of the brand submitted by the Mallinckrodt Chemical Works to await the accumulation of further clinical evidence.

1. Schnohr, Edgar: Treatment of Urinary Infections with Calcium Mandelate, *Lancet* 1:1104 (May 8) 1937.

2. Melton, George, and Rosenheim, M. L.: Calcium Mandelate, *Lancet* 1:494 (Feb. 26) 1938.

3. Droller, Hugo: Calcium Mandelate and Sulfanilamide in Treatment of Urinary Infections, *Brit. M. J.* 2:657 (Sept. 24) 1938.

4. Cailleux, Roland: La médication mandélique dans les colibacillose, *Gaz. méd. de France* 45:447 (April 15) 1938.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, OCTOBER 19, 1940

IMPORTANT ANNOUNCEMENT

At this time The Journal is compelled to inform its readers that the work of the American Medical Association as a body, including its contribution in aid of the national defense, must suffer serious interference during the next two or three months. The Secretary and General Manager of the American Medical Association, the Editor of its publications, the Secretary of its Council on Medical Education and Hospitals and the Director of its Bureau of Medical Economics must be absent from the headquarters office during those months since they are required to attend, as defendants, their trial in the United States District Court for the District of Columbia on the indictment there returned against them and against the American Medical Association, the Medical Society of the District of Columbia, the Washington Academy of Surgery, the Harris County (Texas) Medical Society and fifteen prominent physicians in Washington, D. C. The indictment charges all defendants with having conspired to violate Section 3 of the Sherman Anti-Trust Act. The Association respectfully asks the indulgence of the medical profession and the public throughout the United States for any deficiencies which may result from this unavoidable and unfortunate condition.

When the American Medical Association was requested to assist in the national emergency now confronting this country, its House of Delegates voted unanimously and without dissent to give wholehearted cooperation and support. The officers, the headquarters office, the Committee on Medical Preparedness, the state chairmen and numerous other physicians have been and are now engaged intensively in that service, and they expect to continue therein. In advising physicians and the public of this apparent discouragement in the essential work that it has undertaken to perform, the Association desires to say that it will do its utmost to overcome all obstacles to medical preparedness. We assure the medical profession that it will never be said, either in criticism or in comment, that the Association failed its country in any hour of need no matter what obstacle might arise to

interfere with the otherwise expeditious and efficient service that this country deserves in this critical hour.

The Journal has indicated repeatedly the difficulties associated with medical mobilization and the nature of the work now being carried on to provide all the various arms of the government with physicians. Even though this work will be seriously hampered by absence from the headquarters office of some of the key men who have been charged with this duty, every possible method will be utilized to carry on the work as expeditiously as can be done. Plans are also being developed for the handling of correspondence, finance, personnel and all the other multitudinous affairs associated with the work of this great organization to the best extent of which the organization is capable, so that the medical world and the public may not suffer by this serious interference with the provision of medical service and the dissemination of knowledge of medical advancement.

EXTRAPLEURAL PNEUMOTHORAX

The simplicity and safety of intrapleural pneumothorax as a measure for collapsing the lung in the treatment of tuberculous cavitation is well known. In a number of cases, however, intrapleural space cannot be produced because of adhesions between the parietal and visceral pleural leaves; in some cases inadequate or contraselective collapse takes place; these conditions make imperative a search for other methods. Thoracoplasty is far more efficient than pneumothorax but is a major operative procedure, deforming and resulting in an irreversible state as far as the compressed lung is concerned. Extrapleural pneumothorax is a recently advocated procedure aimed to produce a selective extrapleural pocket to be maintained by air pressure. The method was first tried by Tuffier in 1891 for a pulmonary hemorrhage. He applied this technic in several cases and attempted to maintain the space by introduction of nitrogen gas. The results of the operation were disappointing because of the tendency of the lung to reexpand. The attempt to overcome this expansion led to various methods of plombage. The dissected extrapleural space was filled with fat (Tuffier), muscle, paraffin and other foreign bodies. None of the methods proved satisfactory either because of infection of the foreign material or because of rupture of the lung tissue. This led to the return to simple apicolysis advocated by Zorini (1932) and by Michelson.

Credit for the development of the technic and indications for the operation of extrapleural pneumothorax seems now to belong to Graf,¹ who in 1936 reported 107 personal cases, and to Schmidt,² who performed the same operation with slight modification in 155 cases (1937). The aim of the operation is to produce a

1. Graf, Walther: Ausblick auf neue Wege in der chirurgischen Kollapstherapie der Lungentuberkulose: Extrapleuraler Selektivpneumothorax und -oleothorax, Deutsche med. Wchnschr. 63: 4 (Jan. 1) 1937.
2. Schmidt, Walter: Gezielte Teilplastik, Pneumolyse, extrapleuraler Pneumothorax und Oleothorax als Methoden einer erhaltenden und schonenden operativen Kollapstherapie, Beitr. z. Klin. d. Tuberk. 88: 689 (Dec. 21) 1936.

selective collapse of the part of the lung involved, by means of an air pocket which is made by stripping the pleural layers off the inner surface of the ribs and intercostal muscle sheaths. An incision is made parallel to the vertebral border of the scapula, the fourth rib exposed and from 6 to 12 centimeters of it resected subperiosteally. Incision of the bed of the resected rib brings the dissecting finger on the endothoracic fascia. Dissection now follows carefully the line of cleavage between the parietal pleura and the endothoracic fascia. The stripping is carried out anteriorly down to the third rib, posteriorly to the sixth or seventh, and medially to the hilus. The operation is easily performed in the absence of extensive or firm adhesions. The wound is sutured hermetically. Air may be injected into the extrapleural pocket thus created at the completion of operation or twenty-four hours later. The postoperative care requires much attention if the operation is to be a success. The difficulties are principally due to the tendency of the compressed lung to re-expand and to a rapid formation of an exudate. Dolley, Jones and Skillen³ recommend daily fluoroscopic control and from one to four refills during the first week. Following this the patient is placed on a seven day schedule. The average amount of air given is 80 cc. The crux of the procedure is the maintenance of the space. Should the x-ray films demon-

strate progressive contraction of the pocket, oleothorax may be tried. Graf and Schmidt believe that every extrapleural pneumothorax must sooner or later be replaced by oleothorax. The mixture employed is 2.5 per cent cajuput oil with 10 per cent iodized poppy-seed oil in olive oil. From 7 to 10 cc. is injected at the first instillation and the quantity is increased daily until the pocket is filled with oil, on each occasion a corresponding amount of air being removed.

Hemorrhage, infection of the exudate, broncho-extrapleural fistula and emphysema may complicate the procedure. Dolley, Jones and Skillen endorse in the main the indications for extrapleural pneumothorax formulated by Schmidt and other workers. These may be divided into absolute, broad and conditional. The absolute indications are when (1) attempted intrapleural pneumothorax has been unsuccessful, (2) the cavities

are neither fibrotic nor stiff walled and are not more than 4 cm. in diameter and their involvement does not extend beyond the sixth rib posteriorly, (3) the contralateral lung is free of active tuberculosis and (4) the lesions are nonacute, relatively recent, limited in extent and present in a patient who is a fair or a good surgical risk. The broad indications are when (1) circulatory or respiratory function is only fair, (2) the cavities are somewhat fibrotic or of considerable size and located at the lung periphery, (3) the contralateral lung may be more or less extensively involved and (4) disease may be of a year's duration with widespread though not marked fibrosis. The conditional indications are (1) poor physical condition, (2) old stiff walled cavities in which thoracoplasty is contraindicated because of the size and position of the cavities and (3) the

existence of contralateral cavities. The operation is not intended to replace a selective thoracoplasty. Probably it will find its greatest usefulness in extensive bilateral disease when selective intrapleural pneumothorax is impossible, in less extensive and active disease when collapse therapy is urgently needed but pneumothorax is impossible or unsatisfactory, and when diaphragmatic paralysis is considered inadequate and a thoracoplasty carries too great a risk. It will also be preferable to thoracoplasty in the very young because of the deforming result of the latter and

in the very old because of the hazard of a major operation. The greatest merit of the procedure is the absolute selectivity of the collapse with preservation of tissue and the minimal disturbance caused by the operation.

A number of questions in connection with this procedure have not been answered. How long must the pneumothorax or oleothorax be maintained? Theoretically one might say until the lesion is healed, which may be one or two years or more. Graf believes there is no harm in leaving the oil permanently. The oil may be gradually aspirated. Is extrapleural pneumothorax a reversible procedure? Will the lung reexpand? Complete reexpansion is unlikely because of the greatly thickened parietal pleura and fibrosis induced by the oil.

Dolley and his associates have reviewed approximately 2,000 cases from twenty-seven clinics and have concluded that the extrapleural pneumothorax when performed for absolute and broad groups of indications will be instrumental in obtaining approximately 63 per

THE PLATFORM OF THE AMERICAN MEDICAL ASSOCIATION

The American Medical Association advocates:

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.
2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.
3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.
4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.
5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.
6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.
7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.
8. Expansion of public health and medical services consistent with the American system of democracy.

3. Dolley, F. S.; Jones, J. C., and Skillen, Jane: Extrapleural Pneumothorax, *Am. Rev. Tuberc.* 41:403 (April) 1940.

cent of sputum conversions. There is no procedure according to Graf that produces such dramatically rapid healing in properly selected cases and which at the same time may be attended by so many complications.

It may be argued that creation of an artificial space in the body is an unnatural procedure. The clinical results seem to indicate that the new procedure is a valuable addition to measures for collapse of the lung.

Current Comment

BRINKLEY ON THE BRINK?

According to a newspaper article from a Little Rock (Ark.) newspaper October 4 Dr. John R. Brinkley is having a little more trouble. Five cases are apparently pending against him in the federal court:

Charles F. Allen, administrator of the estate of Oliver S. McKibben, seeking judgment for \$104,200 for the alleged wrongful death of Mr. McKibben.

Billie Leon Ball, minor, by L. S. Ball, guardian, seeking judgment for \$35,000 for alleged wrongful treatment.

Charles F. Allen, administrator of the estate of Louis J. Masopust, judgment for \$261,270 for alleged wrongful death.

E. P. Lambert, administrator of the estate of Abner Johnson, seeking judgment for \$90,000 for the alleged wrongful death of Mr. Johnson.

Charles F. Allen, administrator of the estate of J. F. Crenwelge, seeking judgment for \$264,270 for the alleged wrongful death of Mr. Crenwelge at the Brinkley Hospital.

In connection with these cases, United States District Court Judge Trimble issued an injunction restraining Dr. Brinkley, his wife, Mrs. Minnie T. Brinkley, or their agents from compromising or attempting to compromise these suits pending against Dr. Brinkley in federal court in violation of the laws of the tribunal. The injunction was granted after Dr. Brinkley failed to appear in the federal court to give an oral deposition in the last of the cases mentioned. The judge is said to have stated that "If he [Dr. Brinkley] goes and compromises these cases while this injunction is in effect, I am going to put him in jail for contempt of court." Attorneys for Mr. Allen immediately filed a motion for default judgment under Rule 37 (d) of the new rules on civil procedure recently promulgated by the United States Supreme Court. The attorneys for E. P. Lambert in the Johnson case alleged that they had proof that Dr. Brinkley, through agents, was attempting to compromise the cases through threats to heirs of the deceased. They stated that Dr. Brinkley "is stalling for time to settle these suits around us," without permitting them to go to trial before a "fair" jury. The attorneys continued: "He is sending out his cohorts to attempt to settle these cases directly while the suits are pending in this court." They detailed these charges as follows: That agents of Dr. Brinkley have been busy since July 23, when Brinkley was "first notified to appear here for an oral deposition, attempting to reach a compromise with heirs of the deceased," and that Brinkley "was attempting to influence the heirs to file damage suits in their home towns." They stated that "He [Brinkley] would then settle these cases and come into federal court here and plead *res adjudicata*." Attorneys for Brinkley denied knowledge of the charges and defended Brinkley's absence by stating that they had never guaranteed any one at any time that Brinkley would be there. One of the attorneys stated: "I have

no control whatever over his actions. I notified him of the deposition notice, and that was all I could do." Perhaps these cases may yield the evidence which the Post Office Department seeks before it will deny the use of the mails to John R. Brinkley.

THE TREATMENT OF TETANUS

The therapy for tetanus has never been considered notably successful. Recently a new procedure has been reported by Spaeth¹ from the University Hospital, Iowa City, the results of which offer a favorable comparison with other methods previously employed. The routine used emphasizes systematic sedation, conservative surgical intervention, efforts to prevent pneumonia and the maintenance of an adequate fluid and caloric intake. Avertin with amylene hydrate, given rectally, or sodium amylal, given preferably to avertin with amylene hydrate in the presence of rectal irritation or incontinence and possibly in renal or hepatic disorders by any of the available channels of therapy (intravenous use limited to severe asphyxial spasms), or the two in conjunction, were found to effect a prompt and satisfactory control of neuromuscular manifestations of the disease. Control of spasms and the appearance of muscular relaxation ordinarily occurred within five to ten minutes, provided adequate doses were employed. The induction of severe cerebral depression indicated a grave condition, and persistence of convulsions despite intensive sedation made the outlook particularly serious. Spaeth recommends the prompt use of antitoxin in all cases of tetanus, regardless of the clinical picture or the duration of the disease. The frequent absence of local lesions and the possibility of atypical modes of onset counsel the prompt administration of antitoxin even when the diagnostic data are inconclusive. The intrathecal administration of antitoxin is rejected on the ground that it is based on an erroneous conception of the pathogenesis of tetanus. Intrathecal serotherapy may, moreover, contribute to a fatal outcome by causing excitement, serum meningitis and possibly cerebral or medullary edema. On the other hand, the intravenous procedure is recommended for routine use and the intramuscular for persons known or suspected to be sensitive to horse serum antitoxin. Patients with convulsions were given the entire dose at one time, one half being given deep in each gluteal region. For patients free from convulsions the gradual administration of serum is recommended. Surgical treatment of tetanus, the author thinks, is ordinarily not an emergency procedure and should not be employed until the patient has been given the benefit of adequate sedative and antitoxin therapy. When circulating antitoxin fails to neutralize toxins, a careful search for splinters or other objects may identify the focus of infection. Surgical exploration does not seem justifiable, if nail puncture wounds appear to be healed. In the presence of gas gangrene, the wide excision of involved cases and the use of sulfanilamide are indicated. The new treatment has been employed in thirty-three cases since 1933 with an equal number of controls. There were twelve deaths in the control group and nine in the new, a difference

1. Spaeth, Ralph: A Clinical Study of Tetanus, *Am. J. Dis. Child.* 60:130 (July) 1940.

which may be significant but requires a larger series of cases. In spite of these apparently improved results, Spaeth stresses the importance of active immunization by means of tetanus toxoid and especially of the value of combined tetanus-diphtheria toxoid in the immunization of children.

"THE ELASTIC ELEMENT" IN SICKNESS INSURANCE

A system of life or fire insurance can be a symmetrically built structure with mathematically accurate relations; the elements in the structure can be clearly defined. Fire and death are facts about the existence of which there usually is no dispute and the incidence of which can be calculated with a close approach to accuracy. Illness and its diagnosis and treatment are uncertain in their incidence, indefinite in their scope and character, variable in form and changeable in time. Any system of prepayment for medical service must be a structure with many loose joints and elastic sections that can be squeezed and stretched to meet incalculable changes. If income is fixed and payments to physicians are standardized through salaries, the elastic element must be the quality of the medical service. European writers on sickness insurance freely admit that it is always necessary to squeeze the service until it is rather thin and the physician's income until it is scant to get them into the limits set by insurance resources. Advocates of compulsory sickness insurance and types of contract medicine in this country deny or avoid all mention of this fact. They talk as if the income from insurance premiums were the flexible element that could be stretched to cover all required medical service. Somehow they never tell the prospective patients that the squeeze must really fall on the quality of the service. This is, nevertheless, so fundamentally true that any plan which promises "complete medical service" for fixed payments must sooner or later maintain financial solvency by reducing the quality or the quantity of the medical service and by skimping payments to physicians. The patients cannot realize the significance of deterioration in the quality of medical service. Diagnosis may become superficial, incompetent specialists may be hired or expensive types of treatment may be avoided and the patient will be none the wiser. The state and county medical societies that are experimenting with prepayment plans frankly face this fact and try to meet it honestly. They seek to introduce an elastic element into their structure that will not lower the quality of the service. The unit system lets the pressure fall on the physician's income, and the "deductible clause" puts a portion of the burden on those receiving the service. Similar elastic elements in other departments of the structure than that of service are financial rewards to those not using the service in any year and small payments for the first calls in any illness. Somewhere in every prepayment structure such elements of flexibility must be introduced just as they must be into a building or a bridge subject to incalculable strains. None of these devices have yet been demonstrated as wholly satisfactory, but any of them can be demonstrated to be far more desirable than the concealed use of diagnosis and treatment as the elastic element.

SIR HENRY HEAD—NEUROLOGIST

The death of Sir Henry Head from Parkinson's disease on October 9 at his home in Reading, England, at the age of 79 closes an eminent career. As early as 1889 Head, working in Hering's laboratory in Prague, began his fundamental reports on the functions of the peripheral nerves. His investigations on the cutaneous distribution of pain and tenderness in visceral disease showing that the segmentation of the cutaneous areas affected by the different viscera corresponds with that belonging to the root ganglions of the spinal nerves are known to every medical student. These areas are now known as "Head's zones." In 1903 he made the unique experiment of dividing his own left radial and external cutaneous nerves. The observations of the loss and restoration of sensation which he experienced, together with extensive subsequent investigations, led to a new classification of sensory paths. His work on peripheral sensation is therefore epochal and Head's name will always rank high in the history of neurology.

EMERGENCY LABELS FOR UNPASTEURIZED MILK

Pasteurization of milk, universally approved by physicians, health officers, milk producers and the producers of certified milk as well as by the American Association of Medical Milk Commissions, grows more widespread year by year. In many localities it is now illegal to distribute unpasteurized milk, except certified, for which pasteurization is permissive rather than mandatory. While equipment for pasteurization has been improved in many ways, it is still impossible to safeguard the pasteurizing plant against all the causes of breakdown. Situations may arise in which it is necessary to deliver unpasteurized milk in communities where pasteurization is required by ordinance. Such a situation is potentially dangerous, since it may be necessary to put unpasteurized milk in bottles labeled as if they contained pasteurized milk. Even if the label was changed for the emergency, few householders would be likely to note the change, since they would not be in the habit of reading the label daily. Among the causes for failure of pasteurization beyond the control of the operator listed by the New York State Department of Health¹ are flood, storm or other disaster resulting in failure of electric power over a wide area "making it impossible for operators of pasteurizing plants to pasteurize their milk supplies." To meet this emergency the New York State Department of Health has devised a collar to be slipped over the milk bottle bearing the warning that milk so labeled has not been pasteurized and that it should be boiled before using. The text of the warning is as follows:

Raw milk—Warning—Due to an emergency over which the dealer has no control, this product is raw instead of pasteurized as labeled. Play safe and boil before using.

According to the New York State Department of Health, "these notices are to be used only in case of widespread emergency. They should never be used when it is possible for dealers to have milk pasteurized at another plant. Health officers may obtain these warnings from the district health officer."

1. News Service, New York State Department of Health, Albany, Aug. 5, 1940.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

WORK OF THE INDUCTION BOARDS

Already young men have registered for selective service, the drawings will soon occur, and the young men will be called by local draft boards previous to their call for attendance at induction stations. At each of these induction stations there is to be a board of medical examiners who will be responsible for determining whether or not young men will be actually assigned to camps and cantonments for training. During mobilization the usual flow of men will be from local selective service boards to induction stations for final examination and induction, then to reception centers for classification and other processing, then to the organizations, installations or replacement centers in which they are to serve.

The induction station serves the same purpose as the recruiting station does in times of voluntary enlistment. Therefore recruiting stations, augmented as required, will be used as induction stations. Corps area commanders are authorized to establish induction stations at any point in their areas. It has been estimated that from nine to twelve induction stations for each corps area will be sufficient, including at least one in every state, which would make about one hundred in all. In sparsely settled areas the induction station may consist of a number of physicians and army officers who will travel from place to place.

In each of these inductions there will be provided ample space, light and toilet facilities. During cold weather the rooms will be heated so that the young men who will be compelled to be nude during the examination will not suffer from cold. Special rooms will be provided for conducting eye, ear, nose and throat examinations, and there must be a room with a sink and toilet facilities for use as a laboratory. Corps area commanders are also expected to furnish necessary equipment where that is not available.

For the physical examination the procedure contemplates an eight hour day with twenty-five men examined every hour. It is believed that it will be found practicable to admit one man to the examining team every two minutes. This will permit ten minutes at the end of each hour for further examination and conferences on difficult cases. The order of the examination is as follows:

1. Laboratory examination of the urine and, when required, of sputum, blood smears and urethral discharges.

2. Withdrawal of blood for the serologic test for syphilis. Blood specimens will be obtained and subsequently tested in federal or state laboratories by personnel assigned by the United States Public Health Service.

3. Eye, ear, nose, throat and dental examinations. Registrants may remain clothed up to this point if desirable. From here on they must be completely nude.

4. Height, weight and chest measurements and examination of the bones, joints and feet. This may be done in one large or two small rooms. The room for the orthopedic examiner should be of sufficient size so that four examinees may be brought in at one time and put through the required movements.

5. General surgical examination.

6. Examination of heart and lungs, for which three rooms will be required, so situated that examiners will not be disturbed by outside noises.

7. Neuropsychiatric examination.

8. Checking of records by the chief of the examining board. At this time requests for x-ray, laboratory and other special examinations will be prepared and provision made when necessary for the examinee to be conducted to the proper army hospital or civilian institution for the examination. Arrangements for a local hospital or clinic to provide these facilities must be made by the chief of the board prior to beginning the examinations. In occasional instances proctoscopic, electrocardiographic and other special examinations may be required.

After registrants are accepted by local draft boards they will be sent for physical examination to medical induction boards. About one hundred such boards will be set up throughout the country, about half of them near army posts and stations. Each board will consist of three internists, one general surgeon, one orthopedic surgeon, two ophthalmologists, one otorhinolaryngologist, one neuropsychiatrist, one clinical pathologist and one dentist.

As explained by Colonel Love in *The Journal*, October 5, pages 1201-1202, the specialists to be assigned to such service will probably include civilian specialists as well as reserve officers, who will be on temporary duty. Civilian physicians will be on a per diem basis and will be used as long as their services are required. It has been proposed that they be paid at the base pay of major with allowances for travel and subsistence while on duty. Physicians preferred for this service are those who, on account either of age or of physical infirmities or because of reasons affecting their civil life, cannot go into military camp. It has been tentatively estimated that the time required for this service might approximate twenty to thirty days in the period between October 16 and February 1.

In order to aid the Army Medical Department in securing physicians for this service, the Committee on Medical Preparedness requests physicians who wish to volunteer to write at once to the Committee on Medical Preparedness, 535 North Dearborn Street, Chicago, marking the envelop "Induction Boards."

THE VALUE OF RADIOGRAPHY IN DETECTING TUBERCULOSIS IN RECRUITS

RAMSAY SPILLMAN, M.D.

New York

The cost of taking men with manifest tuberculosis into the armed forces is a timely subject for study. Certain lessons can be learned from the experience of the World War and the postwar period that it would be costly to ignore.

The physician who has served a term rating cases in the Veterans' Administration has the opportunity to acquire an insight into the problem of the compensation of the disabled veteran that cannot be gained anywhere else. I was thus engaged in 1920 and 1921. I have also had the opportunity to investigate the after-records of a group of members of the old Sixty-Ninth Regiment of the New York National Guard who were diagnosed as tuberculous on radiographic evidence by Dr. Lewis Gregory Cole but who in the absence of physical signs were mustered into the 165th U. S. Infantry. The material derived from these sources seems of sufficient importance to present in some detail.

The cost of compensation of veterans of the World War for tuberculosis is a matter of public record, but it seems far from being a matter of common knowledge. Table 1, compiled from the annual reports, is illuminating.

It is emphasized that the figures preceded by dollar signs are per month, not per year. They are for the last month of the fiscal year. Two columns require explanation for the uninitiated. Column 2, "Vocational Trainees, Section 2," refers to veterans who were receiving vocational training, the section 2 meaning that they were receiving a maintenance allowance in lieu of compensation, as distinguished from section 3, under which tuition and such expenses were paid but compensation was paid and not maintenance allowance. The section 2 trainees, who outnumbered the members of section 3 in the ratio of 92.7 to 7.3 (Annual Report, 1923, p. 391), were carried on a different roll and their number should be added to column 1 to show the actual figure for veterans receiving a subsidy for service connected disability.

It has not been feasible, from the annual reports, to run the figures back past 1922. The annual report for that year is a formidable document, comprising 659 plus xvii pages, twenty-eight charts and 143 tables, but it is surpassed in 1923, when there were 1,082 plus xxiv pages, thirty-five charts and 213 tables, over which I have burned much midnight electricity without finding any figures to fill out the series on compensation.

In column 5 the figure for deaths from tuberculosis in 1922 is obviously out of line. This appears to be because the only figures found were for deaths in Veterans' and Marine hospitals, while the figures for the years just before and after are for deaths in all hospitals. While the statistics are thus not quite complete, they do support the thesis that tuberculosis in recruits runs into big money when veterans call for compensation. Physicians who might be called on as examiners should have some conception of their financial responsibility to the government, and obviously the most efficacious means of examination should be adopted.

Figures have not been found as to the number of tuberculous veterans who were taking vocational training. The total figures were not subdivided into the three great classes of neuropsychiatric, general medical and surgical, and tuberculosis. One inherent difficulty with the scheme of vocational training was this: Except for statutory total disability ratings for amputations, blindness or other disabilities that did not confine the veteran to bed, as a rule only veterans were eligible who were less than totally disabled and who were therefore drawing less than the \$80 to \$100 a month, varying with dependents, which such a rating called for. Under section 2 the maintenance allowance averaged \$126 a month, and under conditions attained a maximum of \$170 (Annual Report, 1923, p. 391). The 1922 report says on page 283:

About 50 per cent of these beneficiaries know that if they apply themselves and complete their training their Government allowances will stop and they will receive less money as initial pay in their new vocations. It is not reasonable to expect all of the group to voluntarily apply themselves to reduce their incomes, especially when they can readily discover the indifferent employees and school officials who will condone their harmful tendencies.

With perhaps unconscious naïveté the statement is made on page 18 of the 1922 report:

Section 2 trainees receive maintenance allowance during the period of training, and during that time are discontinued from the compensation roll. When they have been rehabilitated they will be replaced upon the compensation roll.

Vocational training aimed to prepare veterans not only for trades but, if they were qualified for it, for professions. The annual report for 1923 states on page 40:

There are 968 trainees in medical schools, 1,176 in dental schools, and 520 students in pharmacy. In addition to this, there are 146 students in veterinary surgery, 99 in osteopathy, and 314 taking training in chiropractic.

Vocational training was discontinued with the end of the fiscal year 1928, and the total cost of it, stated on page 35 of the annual report for that year, was \$645,007,450.62. In the absence of statistics showing the classification of trainees by kind of disability, one can only estimate that, since the percentage of tuberculous among the total drawing compensation during the years when the training was in effect varied from 20.68 to 23.70, a reasonable and probably a low proportion to be charged to tuberculosis would be 20 per cent, or 129 million dollars.

METHODS USED DURING THE WORLD WAR

An inquiry as to whether tuberculosis could be more efficiently weeded out in a present day mobilization than it was in the World War necessitates an examination of the methods used for its detection in recruits in 1917 and 1918. The total armed forces of the United States during that war totaled 4,800,000,¹ of whom 4,000,000 were in the army. A study of the army procedure will therefore account for the greater part of the problem. The adviser of Surgeon General Gorgas on all matters pertaining to tuberculosis was the late Col. George E. Bushnell. That this study will lead to conclusions as to certain fundamentals that differ from the opinions held then by Colonel Bushnell should not be interpreted as evidence of either a motive or a desire to detract from the stature of that distinguished army surgeon. Much of the difference in question has been

1. Ayres, L. P.: *The War with Germany: A Statistical Summary*. Washington, D. C., Government Printing Office, 1919.

derived from a study of the very veterans on whom Colonel Bushnell and his personnel passed when the former were recruits, and Colonel Bushnell is not to be reproached for not having knowledge that came into existence only later, any more than the chief of the army air service in 1917 is to be reproached because more efficient planes are available now than then.

It was the consensus of experts in 1917 that adult exogenous infection with tuberculosis is rare, that infection in childhood is well nigh universal and that every infection confers an immunity to anything short of massive doses of bacilli in later life. By the same token, adult tuberculosis was held to result from a reactivation of the antecedent infection. As late as 1928 I was responsible for a brief opus espousing this thesis,² with a by-line to the Trudeau School of Tuberculosis at Saranac Lake, N. Y., where I was taught it in 1919. Colonel Bushnell was a vigorous adherent of this outlook³ and stated:⁴

In the opinion of the medical officers most conversant with the facts, the number of soldiers who had incurred manifest tuber-

be difficult to explain away: for example, the development of six cases in one college fraternity a year after one of its members was found to have a positive sputum, and the development of tuberculosis in a girl several years after her sorority room-mate was found to have tuberculosis. As far as army recruits go, the more efficient the weeding out process for active tuberculosis, the more the question of adult exogenous infection approaches the realm of academic interest only. The problem in hand is this: How can the recruit who already has active tuberculosis be recognized, that he may be rejected for the protection of himself and others?

Colonel Bushnell did a monumental piece of work in training a large number of highly competent physical diagnosticians, to whom he imparted the significance of the post-tussal moist rale and the technic of eliciting it. To a motion picture prepared under his direction, part of it using the principle of the animated cartoon and which I saw not in the army but at school in Saranac Lake, I owe the following indelible concept:

TABLE 1.—Cost of Compensation

Fiscal Year	Total Number Compensated	Vocational Trainees, Section 2	Service Origin Tuberculosis		Deaths from Tuberculosis in Fiscal Year	Compensation per Month, All Causes	Compensation per Month, Tuberculosis	
			Number	Per Cent			Total	Average
1939.....	342,072	.....	55,634	16.27	1,947	\$13,659,562	\$2,963,637	\$53.36
1938.....	340,590	.....	56,389	16.56	1,979	13,663,096	3,026,205	53.67
1937.....	336,528	.....	56,953	16.92	2,249	13,507,032	3,070,957	53.32
1936.....	337,767	.....	58,092	17.20	2,038	13,553,242	3,139,655	54.02
1935.....	336,876	.....	59,141	17.56	1,885	13,515,117	3,202,192	54.15
1934.....	332,216	.....	57,270	17.24	1,660	13,180,139	3,139,232	54.61
1933.....	336,710	.....	63,932	18.99	2,051	14,714,893	3,830,305	59.91
1932.....	338,658	.....	61,371	19.29	2,107	14,500,192	3,859,432	60.90
1931.....	290,285	.....	59,739	19.96	1,868	13,283,319	3,711,091	62.12
1930.....	279,539	.....	55,598	19.89	1,873	12,315,797	3,551,652	63.69
1929.....	262,138	.....	50,335	21.57	1,965	11,555,553	3,600,916	64.36
1928.....	257,530	.....	60,690	23.57	2,097	11,574,308	3,905,822	66.33
1927.....	243,611	238	57,748	23.70	1,862	10,991,795	3,830,265	69.37
1926.....	226,484	1,825	48,150	21.26	1,954	8,948,740	2,858,435	62.69
1925.....	211,644	21,417	45,839	21.66	1,784	7,985,670	2,873,565	62.10
1924.....	179,037	46,317	39,099	21.84	1,145	6,648,270	2,428,040	63.50
1923.....	183,090	95,883	41,551	22.70	1,255	6,802,890	2,721,530	
1922.....	174,024	112,738	36,600	20.68	928*	6,365,205		
1921.....	.....	89,030	.....	.....	1,545			
1920.....	228,951†	15,714	6,018‡	.....	.....	114,763,422†		

* Deaths in government hospitals only.
† Death and disability claims paid to date. Later figures do not include compensation for deaths in service.
‡ Only figure available is for cases in hospitals, U. S. Public Health Service and private.

culous disease as the result of military service was to the number of those who had brought the disease with them into the Army approximately as 1 to 10. In reality it is probably considerably less than 1 to 10.

I am told by more than one recognized expert in tuberculosis that they do not look on adult exogenous exposure today with the degree of complacency that was the rule earlier. The importance of the topic to this study lies in the self-evident conclusion that, if a recruit with open tuberculosis is capable of setting up new lines of tuberculosis in his barrack-mates, an increase in the efficacy of the weeding out process will be of all the more importance in that it will not only take out the individual case but will eliminate others that would develop from the contact. Just to take one communication at random from the copious literature on adult exogenous infection, Diehl and Myers⁵ present evidence on tuberculosis in college students that would

Tuberculosis produces a sticky exudate in the smaller air passages; when they collapse, this exudate glues them together. When they reexpand they separate with a snapping sound, and this snapping sound is the moist rale. So much for the mechanics of the rale. Equally lucid is the presentation of how to elicit it: to get the walls to collapse so that they will stick together, it is necessary to exhaust as much of the contained air as possible. This is achieved by having the patient cough gently at the end of deep expiration. When he inhales after the cough, the air enters, the glued-together walls separate with a snap and the rale is heard in the inspiration that follows the cough that follows the expiration. It is as simple as that. The man who knew the substance of the present paragraph had gone a long way toward becoming a chest expert. (Compare Lawrason Brown: "The specialist has the patient cough, the general practitioner does not.")

We are now in a position to appreciate a situation which involved the draft boards and the chest experts. It should be remembered that in 1917 there were set up in every community draft boards which included local physicians who were supposed to reject draftees with disqualifying defects. The evil that men do lives after them. The good is oft interred with their bones.

2. Spillman, Ramsay: Tuberculosis, and Why, Hygeia 6: 624 (Nov.) 1923.
3. Bushnell, G. E.: A Study in the Epidemiology of Tuberculosis, New York, William Wood & Co., 1932.
4. Bushnell, G. E.: Tuberculosis: The Medical Department of the United States Army in the World War: Communicable and Other Diseases, Washington, D. C., Government Printing Office 9: 200 (chapter 3) 1928.
5. Diehl, H. S., and Myers, J. A.: Tuberculosis in College Students, Tr. Nat. Tuberculosis A., 1936, p. 163.

There is statistical evidence that a great many of the draft boards functioned honestly and intelligently. Their work does not come into the picture today as does that of certain others. To come to the point briefly: "Matson's remark with reference to Camp Lewis⁶ that the material was largely from the Southwest and contained enormous numbers of health seekers whom the boards of the first draft sent, thinking that change of climate might benefit the manifestly tuberculous, undoubtedly applies with even greater force to the command at Camp Kearny.⁷ . . . "In the reexamination of 19,827 men at this camp, 853 cases of tuberculosis were discovered, or 4.83 per cent." It is an astounding state of affairs to find evidence in the army's official publication, written by Colonel Bushnell, that, far from weeding out the manifestly tuberculous, some of the draft boards actually concentrated tuberculosis at some of the camps. It will be shocking when its full force sinks in, after figures are shown on what it costs to take a man with tuberculosis into the army.

The first thing that happened to these recruits after they learned to sing "You're in the army now" was to get an injection of typhoid vaccine, which in a great many cases resulted in a very sore arm. While in a state of body and mind scarcely less lamentable than that in a much earlier military venture described in Genesis 34:25, the recruits were formed in line and conducted past medical enlisted men who taught them to breathe in, breathe out, cough, breathe in, and those who exhibited persistent moist rales to the officers listening in on the last respiratory phase mentioned, with or without such other classic signs as narrowing of Krönig's isthmus, went no further in their military career. One might think that the men rejected were returned to their homes and that that was the end of the matter. The situation was very much otherwise. Many of those rejectees had not known until then that they had tuberculosis. By the simplest association of ideas, many of them believed that what made the arm sore was responsible for the tuberculosis. But whether they learned *de novo* that they had tuberculosis, with or without the belief that it was the "T. P. shot" that produced it, or whether they had come to the cantonment for the change of climate on the prescription of the draft board physician, every one of these rejectees was able to present evidence, acceptable under the law, that dictated the course of the War Risk Insurance rating doctors, of whom I was one, that their tuberculosis had been aggravated by their few days at camp, and they went on the payroll from that time on for the aggravation of the preexisting disease, just the same as if they had incurred it at camp. That the army chest experts got these men too late to prevent their drawing compensation for life, and their dependents after their death, was not the fault of the army chest experts. It was the fault of the draft board setup. It should not have happened in 1917, and it particularly should not happen in 1940, when the public debt is \$327 per capita compared with the 1917 level of \$28.⁸

THE COST OF TUBERCULOSIS

In addition to the compensation and the vocational training, there is a very large additional item to be reckoned in the cost of tuberculosis in the World War. That is the excess of insurance benefits over premiums paid in. Certain figures from the annual report of 1922

are of interest: approximately 4,500,000 persons applied for war risk insurance, or 94 per cent of the 4,800,000 comprising the total armed forces; 80 per cent of the applications were for \$10,000, and the average amount of term insurance applied for was \$8,756. "Over 75 per cent of the men who carried term insurance while in service never paid a premium after their discharge." "The average age of those in service during the war was under 24 years" (Annual Report, 1924 p. 456). The premium at age 25 was \$7.92 per thousand (p. 24).

The annual report for 1924, which was the last fiscal year in which there was a statutory service connection for all cases of tuberculosis, gives figures on pages 399 and 400 which are informative. As of June 30 that year 12,024 veterans had died of tuberculosis on whom there was in force a total of \$99,926,940 of insurance, and 3,833 veterans still living but rated as permanently and totally disabled from tuberculosis were drawing monthly against a total of \$33,043,915; an average policy in force on the deceased group of \$7,868 and for the living group of \$8,621. I have not found figures giving the exact amount of premium credit to be deducted from this total of \$132,970,855, but had premiums been paid monthly at the rate of \$7.92 per thousand annually from the date of the War Risk Insurance enabling act to the end of the fiscal year 1924, the total could not have exceeded $7\frac{1}{3}$ million dollars. To estimate the excess of benefits over premiums as 130 million dollars comes exceedingly close to the actual figure.

Since 25 per cent of the veterans never paid a premium after discharge, any tuberculosis developing after the fiscal year 1924, even though it might be rated as service connected for compensation, had under a 25 per cent chance at best of being covered by insurance in force. So, while there was doubtless a matter of a few million dollars of excess benefits over premiums involved in tuberculosis that developed after that time, it does not enter into an estimate of the insurance cost of tuberculosis that presumably was taken into the service.

There are now some figures to add up:

Pro rata share of tuberculosis in vocational training, 129 million dollars;

Insurance cost of tuberculosis, 130 million dollars;

Compensation cost of service connected tuberculosis to date, in round numbers, 600 million dollars;

Hospital care of service connected tuberculosis, 100 million dollars (table 6).

Total, 959 million dollars.

and the end is not yet. This figure does not include any pro rata share of a number of million dollars expended for hospital construction. Every month that goes by sees approximately three million dollars for compensation added to this bill, and it will take only about five more years to bring the cost of service connected World War tuberculosis to the figure of one billion dollars.

It becomes a nice problem in accounting to estimate, from the foregoing data, just how much it costs to take a man into the service when he has tuberculosis. Any attempt to draw an exact conclusion from the foregoing data would seem silly to me, because the calculations would involve so many factors that are still unknown; but one can form some estimate at least of the order of the figure, and I make it out somewhere around \$10,000 per man to date, certainly not less than \$7,500, a figure to which can be added at least \$50 a month for the rest of the man's life and compensation benefits for

6. Matson, R. C.: The Elimination of Tuberculosis from the Army, *Am. Rev. Tuberc.* 4: 398 (July) 1920.

7. Bushnell: *Tuberculosis*, p. 182.

8. Editorial, *New York Sun*, Aug. 7, 1940.

his dependents after his death. This should answer the question What price change of climate for a man with tuberculosis on the draft board doctor's prescription? It should be remembered that at Camp Kearny alone there were found 853 men with tuberculosis whom the draft boards should have turned back and could have turned back had the examiners known the mechanics and significance of the persistent moist rale and acted on it.

COMPARISON OF METHODS

We now have a background to prepare us for a study of the methods used in the examination of recruits in 1917, compared with the methods available today. Of the three available methods for the mass diagnosis of tuberculosis in the living, namely physical diagnosis, x-ray examination and the tuberculin test, what should be the role of each if the problem of 1917 should confront us again today? I do not propose to advocate the tuberculin test for the mass examination of recruits, which leaves the problem, so far as my own discussion of it is concerned, as to a study of the relative merits of x-ray examination compared with physical diagnosis; not that the x-rays are not a physical means of diagnosis, but using the term physical diagnosis in its time honored sense, implying that the examiner has nothing to aid his own five senses, and relying principally on three of those. This does not ignore the fact that the diagnostic finding *par excellence* is bacilli in the sputum, but for obvious reasons this is not applicable to large scale surveys without previous selection of material.

There is much material available for a study of the relative efficacy of radiography and physical diagnosis, based on the work of examiners who have applied both methods to large numbers. Before I go into these sources I will present some unpublished material put at my disposal by Dr. Lewis Gregory Cole, supplemented by certain follow-up data provided by the adjutant general's office and the research section of the Veterans' Administration. I quote Colonel Bushnell:⁹

Considerable pressure was exercised during the first months after the United States entered the war by a number of prominent physicians and radiologists to induce the Surgeon General to make the radiograph the decisive factor in the diagnosis of pulmonary tuberculosis. The claim was that the work could be done with great rapidity and accuracy, that the negatives were easily stored in a comparatively small space and would form a permanent and more or less infallible record which would not only be of great scientific value but would also decide better than the results of physical examination as to the necessity of rejection, 90 per cent approximately of the men being accepted on their radiographs without further examination of the lungs, leaving the remaining 10 per cent for further study. Even granting that all of the above claims were well founded, it was evident that the practical difficulties in the way of the adoption of this plan were insuperable. Not to mention the enormous cost of photographing the new army and the impossibility of obtaining a sufficient number of plates within a reasonable time, the lack of trained radiologists had to be considered.

The objections stated in the last sentence are not valid today. We have seen that the financial aspect of tuberculosis in the army is of such magnitude that if radiography can promise a substantial saving the cost of doing it fades into insignificance. As for the lack of trained radiologists in 1917, that was true enough; but today the American Board of Radiology lists more than 1,450 diplomates, not counting those limiting their practice to therapy. This does not include a large number of specialists in tuberculosis who have their own x-ray equipment and would be qualified to partake

in meeting an emergency such as the one under discussion. And as for the drawback in 1917 pertaining to a supply of plates (made of glass, most of it imported from Belgium), the magnitude of the x-ray film business today is such that it could meet any demand for films, however great.

To resume the quotation:

A subcommittee of the general medical board of the Council of National Defense undertook a test to determine practically the merits of the proposed scheme. All of the members of certain companies of the 69th New York Regiment, National Guard (later renumbered the 165th Regiment of United States Infantry) were photographed by the x-ray. Certain men diagnosed as tuberculous by this means were examined subsequently by an examining board composed of experts in physical diagnosis from New York City. For various reasons the total number of those who could be obtained for reexamination was only twenty-five. Of these twenty-one were found to have no abnormal physical signs, one had distinct signs of apical involvement with rales in both apices but gave no symptoms, and three had only slight or equivocal signs, of whom but one gave pulmonary symptoms. The last four men were rejected, one of them, however, not on account of physical findings, but because of suspicious history and radiograph. The board was disposed, as will be noted, to be most liberal in its concessions, but its findings can hardly be said to make out a good case for the method, which in this instance was put into effect by skilled radiologists.

It was Dr. Lewis Gregory Cole who put most of the pressure on the surgeon general aforementioned, and it was Dr. Cole who made this survey. There is a slight numerical discrepancy between the figures he gave me and the figures just quoted, in that Dr. Cole recommended the rejection of nineteen men all of whom showed in his opinion definite radiographic evidence of tuberculosis. One showed a cavity, three showed consolidation and the rest showed soft mottling. Not one of these nineteen showed any physical signs, and it is this lack of confirmation by the then supreme criterion that is responsible for the statement that the results could hardly be said to make out a good case for the method. I undertook to follow up the records of these nineteen men to see how many of them later drew compensation for tuberculosis. Of the nineteen, one was killed in action, which eliminated him as a possible claimant for disability as a veteran; of the other eighteen, three were discharged from the army on surgeon's certificate of disability for active tuberculosis before the calendar year 1917 was out and five others died of pulmonary tuberculosis at intervals up to 1938, all eight having been beneficiaries of compensation. No claims were found for the other ten, which may or may not mean that none of them received compensation because of tuberculosis. The possibility must be admitted that one or more of the ten could have filed a claim that was not found when the records were searched for the study. If the ten are left out of it entirely, there is still proof that eight out of the eighteen became heavy compensation liabilities.

X-RAY EXAMINATION VS. PHYSICAL DIAGNOSIS

Evidence bearing on the relative value of x-ray examination and physical diagnosis is available from the home office of the Metropolitan Life Insurance Company in New York. This office at the present time comprises 15,000 employees. The company provides care in its own sanatorium at Mount McGregor for any employees who come down with tuberculosis. For obvious reasons the company does not accept as employees persons with manifest tuberculosis at the time of application. Evidence of tuberculous infection is not cause for rejection,

9. Bushnell. Tuberculosis, p. 193.

but evidence of a parenchymatous lesion is, whether past or present. The company does not discriminate against applicants showing a healed primary complex or hilar calcification. In a recent communication Dr. H. H. Fellows, who initiated and supervises the procedure for caring for the employees, has studied a

TABLE 2.—Incidence of Tuberculosis

Year	Number of Applicant Examinations *	Cases of Pulmonary Tuberculosis			
		All Cases		Clinically Significant	
		Number	Per Cent	Number	Per Cent
1928.....	4,405	62	1.4	48	1.1
1929.....	4,780	52	1.1	34	0.7
1930.....	3,405	31	1.0	19	0.6
1931.....	2,175	21	1.0	12	0.6
1932.....	2,134	22	1.0	12	0.6
1933.....	1,169	19	1.6	9	0.8
1934.....	969	14	1.4	9	0.9
1935.....	764	10	1.3	8	1.1
1936.....	874 *	18	2.1	7	0.8
1937.....	1,557	28	1.8	17	1.1
1938.....	1,697	16	0.9	11	0.7
1939.....	1,545	18	1.2	14	0.9
Total.....	25,171	311	1.2	200	0.8
1928-1935.....	19,498	231	1.2	151	0.8
1936-1939.....	5,673	80	1.4	49	0.9

* From 1926 through 1939 all applicants for employment at the home office received a routine roentgenogram following physical and fluoroscopic examination; therefore, from this date on, the number of applicant examinations is the number of individuals roentgenographed.

large number of employees with and without signs of a healed primary complex and has found the tendency to break down with tuberculosis no greater in the ones who show it.¹⁰ The examination which the applicant is put through is to discover an active parenchymatous lesion or an old one which carries a hazard of becoming reactivated. In my opinion this is identical with the problem that a mobilization would bring. In 1917 the desideratum was to keep out active tuberculosis, but men with obsolete lesions were accepted. The subject is discussed at length in the chapter on tuberculosis by Colonel Bushnell, previously cited. Since the previous mobilization came nowhere near exhausting the supply of man power, the conservation of men to the service with obsolete lesions seems to me today much less important than excluding them for fear that a reactivation would make them compensation liabilities, viewing the problem from the fiscal angle, while it is certainly undesirable to subject a man to the risk of reactivation, viewing it from the medical angle.

But whether the problem in a mobilization today would be to exclude all tuberculosis, in conformity with the procedure of the life insurance company cited, or to exclude only active tuberculosis, the company has statistics that are of intense interest in the present problem. It has data over a period of years on tuberculosis in applicants and on the detection of active tuberculosis in employees. A leaflet published by the company in 1935¹¹ presents the figures through 1934. An article by Dr. Ada Chree Reid¹² in process of publication presents the figures from 1928 through 1939 on tuberculosis in applicants, and a second communication¹³ in process of preparation presents them from 1930 through 1939 on tuberculosis in employees. The company has definite data on the relative value of physi-

cal examination and x-ray examination. Dr. Reid gave me the opportunity to use her figures.

She concludes:¹² "In detecting pulmonary tuberculosis in apparently healthy groups, history and physical examination of the chest are of limited value. Routine x-ray films are the most reliable procedure, but an expensive one."

I have already given some notion of the cost of taking into the army a man who has tuberculosis and have shown that the cost of an improved method of diagnosis would amount to very little in comparison with the saving in the long run.

In the twelve years 1928-1939, 25,171 applicants were examined. The ratio of females to males was 70.4 to 29.6. They were predominantly young, 85.3 per cent being under 30 years. The term "clinically significant" will be used directly; therefore it will be defined:

Includes all cases in which the radiographic shadow indicates a lesion typical of a reinfection form of the disease varying from those obviously active, with associated constitutional symptoms and physical findings, to those without associated findings, but in which the stability of the lesion cannot be determined without periodic supervision.¹⁴

The term "pulmonary tuberculosis" means a parenchymatous lesion; a healed primary complex and/or calcified hilus nodes are not included in this category.

The incidence of tuberculosis in this group of applicants is of sufficient interest in the present study to justify reproducing the table (table 2).

It will be seen from table 2 that when fluoroscopy was introduced as a routine in 1927 the number of applicants examined was at a level so high that the expense of roentgenography would have been formidable. In 1935 (August 1) roentgenography was introduced, one reason being that it was desired to check on the accuracy of fluoroscopy. Roentgenography of the chest of all applicants has been maintained as a routine since that time, and one advantage is, in addition to its being more accurate than fluoroscopy, that there is a film on record for future reference. In 1937 Dr. Fellows reported¹⁵ on 2,603 examinations on applicants for employment, applicants for insurance and others, the examination embodying both fluoroscopy and roentgenography. His observations are given in table 3.

Of the fourteen cases constituting the 13 per cent missed by fluoroscopy, "five were latent or clinically insignificant, while nine were considered clinically active. These nine were classified as minimal and examination of the chest failed to reveal any physical findings."

TABLE 3.—Cases of Tuberculosis Discovered by Roentgenography and by Fluoroscopy

Number examined	2,603
Tuberculosis discovered by roentgenography.....	169
Tuberculosis discovered by fluoroscopy.....	85
Tuberculosis missed by fluoroscopy.....	14
Percentage of error.....	13

Dr. Reid¹² presents a table (table 4), reproduced here, which covers the total of the examinations listed from 1928 through 1939 totaling 25,171 examinations and 311 cases of tuberculosis, 200 of them clinically significant. The size of this group and the unquestioned competence of the examiners make the figures of extreme value to an appraisal of the accuracy of

10. Fellows, H. H.: *J. Indust. Hyg. & Toxicol.* 22: 157 (May) 1940; cited in *Pulmonary Tuberculosis After Healed Primary Complex*, Current Comment, *J. A. M. A.* 115: 136 (July 13) 1940.

11. *Pulmonary Tuberculosis Among Employees at the Home Office of the Metropolitan Life Insurance Company*, a leaflet published by the company undated but, from the context, about 1935.

12. Reid, Ada Chree: *Control of Tuberculosis: I. Tuberculosis in Applicants for Employment*, *J. Indust. Hyg. & Toxicol.*, to be published in October.

13. Reid, Ada Chree: *Control of Tuberculosis: II. Tuberculosis in Employees*, *J. Indust. Hyg. & Toxicol.*, to be published in November.

14. Edwards, H. R.: *Tuberculosis Case Finding: Studies in Mass Surveys*, *Am. Rev. Tuberc.* (supp.) 41: 1 (June) 1940.

15. Fellows, H. H., and Ordway, W. H.: *Fluoroscopy versus Physical Findings in the Detection of Pulmonary Tuberculosis*, *Tr. Nat. Tuberc. A.* 1937, p. 51; *Control of Pulmonary Tuberculosis in an Employee Group*, *ibid.*, p. 211.

physical diagnosis compared with x-ray diagnosis. It must be kept in mind that, since roentgenography did not become routine until past the middle of 1935 (though it was used sporadically before that time), the percentages derived from the totals for the twelve years assign to roentgenography an importance considerably below its actual value. Only the figures from 1936 on afford an estimate of the comparative value of roentgenography and other methods of diagnosis including fluoroscopy. For this reason, two lines have been added to the table constituting a segregation of the figures for 1936-1939. The column headed "unknown" refers to cases in which the record was incomplete as to the method used to establish the diagnosis.

It is self evident that all cases presented a positive roentgenogram but the figures in the column headed "Roentgenogram" are smaller than the number of cases. This is because the diagnosis was credited to the first means which made it, reading the column headings from left to right. If a case showed physical signs, the diagnosis was credited to physical signs and not to fluoros-

the applicants' group introduces some element of personal equation; in the employees' group this is eliminated, and the figures stand as the results found by a competent examiner on subjects already shown by the roentgenogram to be tuberculous. Even under these favorable auspices for positive results competent physicians found rates in only thirty-four of 254 cases and no rates in 208.

This is not a palatable conclusion for older clinicians who pride themselves on their ear for signs, and the immediate reaction that can be anticipated is that the competence of the physical examiner(s) will come into question. Dr. Reid tells me that even the check-up examinations are not done under entirely ideal conditions of quiet but that she feels that the conditions under which the work is done are at least as favorable as would attend the mass examination of recruits by an army chest board. Furthermore, the record should show that more than 90 per cent of the tuberculous employees accept sanatorium treatment at Mount McGregor, where the resident staff includes one man

TABLE 4.—Pulmonary Tuberculosis in Applicants for Employment: Distribution According to Methods by Which Tuberculosis was Detected

Year	Method of Detection—All Cases							Method of Detection—Clinically Significant Cases						
	Total	Family History	Past History	Symptoms	Physical Examinations	Fluoroscopies	Roentgenograms	Total	Family History	Past History	Symptoms	Physical Examinations	Fluoroscopies	Roentgenograms
1928.....	62	5	4	..	12	39	..	48	5	4	..	11	28	..
1929.....	52	5	6	1	8	32	1	34	5	2	1	7	18	1
1930.....	31	2	6	..	..	20	1	19	2	3	..	..	13	..
1931.....	21	..	2	..	2	16	..	12	..	2	..	1	9	..
1932.....	22	..	2	1	1	15	3	12	..	1	1	1	8	1
1933.....	19	..	2	..	2	13	..	9	..	..	..	2*	7	..
1934.....	14	..	3	..	1	10	..	9	..	1	..	..	8	..
1935.....	10	1	..	..	..	9	..	8	..	..	..	..	8	..
1936.....	18	2	1	..	1	11	3	7	1	..	..	..	5	1
1937.....	28	2	5	..	1	8	13	17	1	4	..	1	6	5
1938.....	16	1	2	..	1	10	2	11	1	..	..	1	8	1
1939.....	18	2	2	..	..	9	5	14	2	2	..	..	6	..
Total.....	311	20	34	2	29	192	27	200	17	19	2	24	124	13
Per cent—all years.....	100.0	6.4	10.9	0.6	9.3	61.8	8.7	100.0	8.5	9.5	1.0	12.0	62.0	6.5
Total 1936 to 1939.....	80	7	10	0	3	38	22	49	5	6	0	2	25	11
Per cent.....	100.0	8.75	12.5	0	3.75	47.5	27.5	100.0	10.3	12.2	0	4.1	51.0	22.4

* In one case a roentgenogram was ordered because of poor general appearance; no chest signs were present.

copy; if fluoroscopy was the first means to establish the diagnosis, the diagnosis was credited to that and not to roentgenography. Obviously cases are not subjected to a hard and fast diagnosis on family history, but in cases in which the family history was sufficiently strong to lead to great suspicion, and that suspicion was confirmed by other means, the diagnosis was credited to family history. An employee coming down with a pulmonary hemorrhage would be apt to show physical signs, but the diagnosis is credited to symptoms. Therefore it would be an injustice to the procedure of physical diagnosis to estimate its efficacy by the percentage of diagnoses with which it is credited in table 4.

Fortunately the significant data on all the cases diagnosed in applicants and employees are on cards in Dr. Reid's possession, and she went over 624 cards to give me the figures in table 5.

Owing to incomplete records on a very few cards, the books do not quite balance as to totals for physical signs and for fluoroscopy; but the error is not statistically significant.

The great majority of the applicants diagnosed as tuberculous and all of the employees so diagnosed were referred to Dr. Reid for further study. "Positive on reexamination" refers to the specialist's check-up examination. That Dr. Reid did not examine every one of

who to my personal knowledge was on the resident staff at Trudeau too long not to know physical signs when they are present and whose skill in physical diagnosis will be attested by any one who ever attended the Trudeau School of Tuberculosis in his time. I refer to Dr. G. S. Pesquera. There is no significant disagreement on physical signs between the staff at Mount McGregor and the home office staff that refers the patients; just to show that the home office staff is not diagnosing imaginary tuberculosis, one patient out of three has a positive sputum, physical signs or no physical signs.¹¹

It is not expected, in the event that an army should be raised today, that it would be equipped in matériel and training with nothing later than 1917. By the same token "the only trustworthy sign of activity of apical tuberculosis is the presence of persistent moist rales,"¹⁰ which was the last word, so far as the army was concerned in 1917, is shown in the light of present day knowledge to be worth only about 12.5 per cent. There is every reason to believe that for all the skill of the army examiners, and they included a large number of specialists from Lawrason Brown down, who were accepted for special service notwithstanding that they

16. Bushnell: Tuberculosis, p. 175.

were tuberculous themselves, only about one eighth of the actually existent clinically significant tuberculosis was detected because of the limitations of the method. In 1917 it was not common to take roentgenograms of chests unless they showed physical signs. The seven-fold excess of roentgenographically demonstrable tuberculosis over stethoscopically demonstrable tuberculosis became common medical knowledge only some years later.

RADIOGRAPHY THE CRITERION

This paper has been an utter failure if it has not established that radiography should be the criterion in weeding out tuberculosis in the event of mobilization today and that the cost of the procedure is negligible in comparison with the saving. The question then arises How should the radiography be done? The omission of fluoroscopy is deliberate. Fluoroscopy gives no permanent record, it is highly subjective and it introduces the personal equation, and I offer no rebuttal to the devastating attack on it made by Matson¹⁷ in respect to its value in detecting tuberculosis in recruits. Crediting the five questionable cases as hits, the Metropolitan's statistics just quoted credit the fluoroscope with 210 positive results and 37 negative, an error of 15 per cent, scarcely negating Fellows' earlier claim on material in the same series of an error of 13 per cent. This is a much smaller percentage of error than I find quoted by any other workers in tuberculosis. Much more typical, in my own belief, are the results of Boynton, Diehl and Shepard:¹⁸ In 126 cases of the adult type of tuberculosis among Minnesota University students, fluoroscopy suggested pathologic changes in 56 per cent of the fibrotic cases, 34 per cent of the incipient, 57 per cent of the moderately advanced and in all of the far advanced. This does not imply that, to transfer the procedure to mobilization, fluoroscopy would do as well as 50 per cent accurate; because in 5,158 students sampled at random over a period of five years, "in 13.3 per cent the fluoroscopic findings were suggestive of pulmonary pathology; in 5.3 per cent the x-ray of the chest was positive." But this 5.3 per cent does not mean the adult type of tuberculosis, because the incidence of that for the whole student body was only 0.18 per cent. I will add my voice to Matson's that to set up fluoroscopy as the criterion at a time of mobilization would be a grave error. However, I dissent from his deprecation of "roentgenology" when he uses the term to designate fluoroscopy. Radiography is something entirely different. At the Metropolitan Life Insurance Company, where an annual examination of the employees would require 15,000 roentgenograms if roentgenography were made a routine, fluoroscopy in the hands of a highly alert personnel serves the purpose as an alternative to a prohibitively expensive routine of roentgenography; but even the Metropolitan is continuing today its routine roentgenograms, adopted in 1936, of the chest of every applicant, to be filed for future reference, and it uses roentgenography freely on employees whenever needed.

To return to the question of how to do the radiography, there are all kinds of x-ray machines, from portables to three phase installations costing \$6,000, with tubes varying from the portable tube at something like \$100 to the rotating anode tube at something like \$700. There are films, with and without intensifying

screens, and there is paper; of late there is photography of the fluoroscopic screen, further subdivided into 4 by 5 inch photography and 35 mm. photography. Every permutation and combination of equipment has its articulate proponents and its commercial representatives. During my vacation in the past summer I was shown an installation in a large university which had come in for considerable criticism by a reputable institute that enjoys a reputation as a consultant on x-ray installations. The machine used only one rectifying tube, which was reported as not the ideal equipment for chest work; and yet this modest outfit, which the institute quite properly found far behind the ideal, was producing technically excellent roentgenograms on which incipient tuberculosis was being diagnosed long in advance of physical signs. Theoretically, the best chest radiography is that done with the shortest exposure, with the smallest focal spot, at the maximum feasible tube-film distance by the most competent worker. The last specification, in my opinion outweighs all the others. The short exposure requires power; the smallest focal spot requires a rotating anode,

TABLE 5.—Clinically Significant Tuberculosis in Applicants Over the Eleven Years 1929-1939

	Minimal		Moderately Advanced		Far Advanced		Total	
	Physical Signs	Fluoroscopy	Physical Signs	Fluoroscopy	Physical Signs	Fluoroscopy	Physical Signs	Fluoroscopy
Positive.....	7	87	12	61	6	23	25	170
Negative.....	98	19	50	2	13	0	161	21
Questionable.....	9	8	4	1	1	..	14	11
Positive on reexamination	10	5	4	1	2	..	16	6
							216	208
Clinically Significant Tuberculosis in Employees								
Positive.....	5	154	15	65	5	6	25	205
	154	31	53	2	1	0	208	37
	10	3	7	..	..	..	12	5
	2	3	7	..	..	..	9	3
							254	250

and so on. A communication by Pesquera and Sampson¹⁹ presents a curve showing expenditure of money plotted against sharpness of radiographic detail, and it is of more than passing interest that it is the same old exponential curve, the curve of the law of diminishing returns, that governs the whole gamut of vital processes. This curve is true, all other things being equal; but as between, let us say, Sampson with a portable machine and Joe Doakes with a \$6,000 three phase machine, I will take the work of Sampson every time.

The paper roentgenogram vs. the celluloid film is a leading matter of controversy today, the radiologists as a whole having very little use for the paper while the tuberculosis workers are enthusiastic over it because it comes in rolls of 100 exposures, which can be converted into roentgenograms as fast as the personnel can affix the roentgenographed-on labels and conduct the subjects to the machine. The roll is sent back to the factory for processing and a few days later is returned to the survey staff for reading. The cost per unit of sensitive surface is about half that of the film; the handling is much less expensive because of the application of mass production. Yet I have not the slightest

17. Matson, R. C.: The Value of Chest Fluoroscopy, J. A. M. A. 72: 1887 (June 28) 1919.

18. Boynton, Ruth E.; Diehl, H. S., and Shepard, C. E.: The Relative Value of Fluoroscopic, X-Ray and Physical Examinations in a Tuberculosis Case Finding Program in University Students, Tr. Nat. Tuberc. A., 1937, p. 54.

19. Pesquera, G. S., and Sampson, H. L.: The Evolution of Chest Roentgenographic Technic with Special Reference to the Modern Concept, Tr. Nat. Tuberc. A., 1937, p. 312.

doubt that, were the manufacturers of celluloid film to make that material available in similar form, the most enthusiastic devotees of the paper would gladly switch to the celluloid. There is no question that the roll of 100 exposures lends itself to rapid surveys much better than the single film, and between washing 100 14 by 17 films in the average darkroom and having the 100 on a roll processed at the factory, there is no question either. As I visualize the problem of a sudden demand for say a million chest roentgenograms, it is my own notion, not based on anything official from the army, that the army has a pretty good idea what the radiographic resources of the country are and where they are; and it would require the whole-hearted cooperation of every facility that can produce an acceptable roentgenogram to execute the job, without any controversy over paper vs. films. I am not a devotee of paper; but I should vastly prefer paper roentgenograms to no

TABLE 6.—Cost of Hospital Care of Service Connected Tuberculosis

Fiscal Year	Operating Costs of Tuberculosis Hospitals	Tuberculous Veterans in Hospitals at End of Fiscal Year	Percentage with Service Connected Tuberculosis	Pro Rata Cost of Tuberculosis for Service Connected Tuberculosis*
1940.....	\$6,485,100.49	.....	.....	\$1,250,000 *
1939.....	6,340,141.15	4,913	19.66	1,240,000
1938.....	6,369,896.65	4,837	20.67	1,320,000
1937.....	6,491,484.77	4,789	22.22	1,440,000
1936.....	7,085,683.72	4,839	23.71	1,680,000
1935.....	6,661,574.50	5,134	24.72	1,640,000
1934.....	6,290,588.06	5,032	24.66	1,550,000
1933.....	7,316,955.80	5,425	29.35	2,140,000
1932.....	9,063,849.61	6,499	31.17	2,820,000
1931.....	9,287,707.82	6,193	39.88	3,790,000
1930.....	9,384,663.14	6,274	48.69	4,570,000
1929.....	9,713,328.56	6,121	51.92	5,030,000
1928.....	9,746,442.43	6,045	58.11	5,650,000
1927.....	10,247,928.46	6,658	69.27	7,110,000
1926.....	10,865,703.27	7,308	83.63	9,280,000
1925.....	10,222,308.15	9,314	90.36	9,380,000
1924.....	9,254,202.88	8,082	100	9,230,000
1923.....	9,015,490.41	9,577	100	9,010,000
1922.....	8,942,143.99	10,849	100	8,940,000
1921.....	.....	10,337	100	8,550,000 *
1920.....	.....	6,018	100	5,130,000 *
1919.....	.....	1,362	100	1,000,000 *
Totals.....	\$158,784,903.86	.....	.....	\$100,430,000

Column 1 of this table is from a personal communication from the chief of statistics of the Veterans Administration dated Sept. 27, 1940.

Columns 2 and 3 are from table II of the Annual Report of the Administrator of Veterans' Affairs, 1939.

Column 4 is derived by multiplying column 1 by column 3.

* Indicates estimate by extrapolation in the absence of available figures.

roentgenograms and I should prefer celluloid to paper were I given the choice.

As to photography of the fluoroscopic screen, I have very serious doubts whether it is as good as 90 per cent efficient compared with the standard celluloid roentgenogram, and a 10 per cent shortage in diagnosis would cost a great deal of money in compensation later, as can be seen by referring back to the compensation statistics. This method, known as fluorography, is limited at present to institutions that on occasion could produce probably an equal number of roentgenograms of full size were expense not the consideration. The difference in cost between full sized roentgenograms and 35 mm. miniatures would be saved many times over and over on a differential of diagnostic accuracy of only 10 per cent. Fluorography is today a highly promising method, but for it to compete with celluloid roentgenograms as to accuracy awaits, in my opinion, a fluoroscopic screen free from grain, and to date freedom from grain entails sacrifice in speed.

Readers of Tolstoy will recall a situation in Anna Karenina in which Kitty, pining for unrequited love,

went into a decline. A big specialist was called in who delivered himself as follows: "The commencement of the tuberculous process we are not, as you are aware, able to define; till there are cavities, there is nothing definite. But we may suspect it. And there are indications: malnutrition, nervous excitability, and so on."

This was written in the sixties, and yet in 1917 Dr. Lewis Gregory Cole demonstrated a pulmonary cavity in a member of the New York National Guard who showed no physical signs and was taken into the army, only to be discharged on S. C. D. for tuberculosis before the calendar year 1917 was out and went on the compensation roll at once as a total disability.

The point might be raised that the death rate from tuberculosis was 124.6 per hundred thousand of population in 1917 and only 49 in 1937. This comes far from proving that the incidence of clinically significant tuberculosis in the population has undergone a proportionate reduction. In 1928, when the Metropolitan Life's home office statistics begin, the death rate was 70. The incidence of tuberculosis in its applicants has remained extraordinarily uniform over this period; certainly it has not shown the least tendency to parallel the death rate trend. The only approach to a nation wide survey of the incidence of tuberculosis was the sampling involved in the World War draft, and that was based on physical diagnosis. A radiographic survey today would, judging from the Metropolitan's figures, show approximately eight times as much, given an identical incidence. To reproduce the procedure of physical diagnosis in recruits by the same method as was used in 1917 would give statistics of tremendous value as to the incidence of tuberculosis now as compared with then; but, in the light of the material just examined, that would be its principal value. To use the physical examination as the criterion would be to take into the army a vastly augmented amount of diagnosable tuberculosis, and that is extremely undesirable for three principal reasons: the tendency of the strenuous exertion to activate latent tuberculosis, which is bad for the individual, the infection of adults in close contact (a conception not endorsed in 1917), which is bad for the community, and the excess of compensation resulting, which is bad for the taxpayer.

I regret that it has not been feasible to go thoroughly into the literature. However, to do so would be to postpone publication of this communication until a time possibly less opportune than the present.

SUMMARY AND CONCLUSIONS

1. Tuberculosis during and after the World War has cost approximately \$960,000,000 to date in compensation, vocational training, insurance and hospitalization.

2. Physical diagnosis, which was the criterion of fitness for the World War, is shown by experience, much of which has accumulated since that time, to be much less reliable than radiography in situations analogous to the examination of recruits.

3. A huge amount of compensation has been paid out to men manifestly tuberculous at the time they were sent to camp who should have been rejected by the local draft boards but were not.

4. A normal chest roentgenogram should be the criterion of acceptance in a future mobilization, including the proposed draft for training, and it should be made and reported before the recruit has spent a night away from his own roof to obviate a repetition of the claims for aggravation of preexisting tuberculosis which occurred during and after the World War.

115 East Sixty-First Street.

MOBILE HOSPITAL FOR THE NAVY

The U. S. Navy will ship next month to Guantanamo, Cuba, a new 500 bed mobile hospital which will be rushed to any outpost in the western hemisphere where American fighting forces may need hospital care. Packed in crates, the hospital measures 112,000 cubic feet and it occupies all the space on a 500 foot pier in the North River, New York. In the Brooklyn Navy Yard a freighter is being overhauled to transport the hospital. Thirty medical officers and 300 enlisted men of the navy will staff the hospital. Between its arrival in Guantanamo and Jan. 1, 1941, the staff will be given practice in unpacking and setting the hospital up completely and tearing it down for repacking. The new unit is part of the medical side of the national defense program and will be moved to outposts in South, Central and North America as the need arises.

ADVISORY COMMITTEE ON PREVENTION OF BLINDNESS

The National Society for the Prevention of Blindness has appointed an industrial advisory committee to deal with the increase in industrial eye diseases and accidents to the eyes which is expected to result from the national defense program. Industry has made progress in the campaign to protect the sight of workmen, but new processes have created additional hazards. The national defense program, necessitating the employment of large numbers of men in new jobs, working in strange surroundings, makes for an inevitable increase in the danger of accidents, it was stated. Dr. Leonard Greenburg, executive director of the division of industrial hygiene, New York State Department of Labor, will head the committee, which includes the following members:

Lyman A. Bliss, Linde Air Products Company, New York.
Roy Bonsib, chief safety inspector, Standard Oil Company of New Jersey, New York.
Dr. Morris Davidson, ophthalmologist, New York State Department of Labor, New York.
Edward R. Granniss, director, industrial engineering division, National Conservation Bureau, New York.
Harry Guilbert, director, bureau of safety and compensation, The Pullman Company, Chicago.
Charles E. Hill, general safety agent, New York Central Lines, New York.
George E. Sanford, General Electric Company, Schenectady, N. Y.
Dr. Donald M. Shafer, consultant, committee on healthful working conditions, National Association of Manufacturers, New York.
Leo D. Woedtko, Fred T. Ley & Company, Springfield, Mass.
V. A. Zimmer, director, division of labor standards, U. S. Department of Labor, Washington, D. C.

MEDICAL COMMITTEE FOR AID TO BRITAIN

A medical subcommittee of the Committee to Defend America by Aiding the Allies, of which William Allen White, editor of the Emporia (Kan.) *Gazette*, is chairman has recently been formed. The subcommittee urges physicians to enroll in local branches of the main committee, to send letters and telegrams to congressmen and presidential candidates stressing the need for all possible aid to Britain and to send contributions to the national committee. Members of the subcommittee are

Drs. Emile Holman, Eugene S. Kilgore and Ray Lyman Wilbur, San Francisco; Roger I. Lee, Boston; Warfield T. Longcope, Baltimore; John H. Musser, New Orleans, and Dallas B. Phemister, Chicago.

CALIFORNIA UNIVERSITY APPOINTS MEDICAL DEFENSE COMMITTEE

A committee of physicians and dentists to study ways and means by which the University of California Medical Center can contribute to national defense preparations has been appointed by President Robert Gordon Sproul. Dr. Howard C. Naffziger, professor of surgery, has been named chairman, and other members include Drs. Robert B. Aird, Leroy H. Briggs, Charles L. Connor, Leon Goldman, William J. Kerr, Karl F. Meyer, W. C. Fleming, D.D.S., dean of the college of dentistry, and Carl L. A. Schmidt, Ph.D., dean of the college of pharmacy. The committee will arrange to fill teaching vacancies which may occur when members of the faculty holding national guard or army and navy reserve commissions are called to active duty.

HOSPITALS OFFER USE OF CLINIC FACILITIES TO DRAFT BOARDS

The president of the Greater New York Hospital Association announces that fifty New York hospitals have offered the free use of their clinics and other facilities to local draft boards for the physical examination of conscription men. Physicians and other necessary personnel will be assigned by each local draft board. The physical examinations will be made in the evening. The following hospitals will cooperate with the local draft boards:

In Manhattan:	Swedish
Beckman Street	Norwegian Lutheran
Memorial	Deaconesses' Home
New York Polyclinic	St. John's
Medical School	St. Catherine's
Lenox Hill	Holy Family
Joint Diseases	Caledonia
St. Elizabeth's	Israel Zion
St. Vincent's	Beth-El
Sydenham	Methodist
New York Post-Graduate	Wyckoff Heights
Beth David	In Queens:
St. Clare's	St. John's
Manhattan Eye, Ear and Throat	Long Island City
Roosevelt	Jamaica
Lutheran	Rockaway Beach
Columbus	Flushing
New York Orthopedic Dispensary	Mary Immaculate
New York Infirmary for Women and Children	In Staten Island:
Beth Israel	St. Vincent's
French	Staten Island
In the Bronx	In Mineola:
Montefiore	Nassau
St. Francis	In Bay Shore:
Bronx	Southside
In Brooklyn:	In Hempstead
Long Island College	Mercy
Carson S. Peck Memorial	In Glen Cove:
Bushwick	North Country Community
Unity	In Huntington:
Brooklyn	Huntington
Prospect Heights	In White Plains:
	White Plains Hospital

17. Information About Syphilis.

An exhibit consisting of two transparency cases showing various syphilitic lesions; a large exposition microscope showing *Spirochaeta pallida*; an exposition file containing brief paragraphs on the subject of syphilis together with various charts and posters.

Space required, an area 10 feet wide by 6 feet deep; no background necessary.

Electrical connections, three outlets for lamps, requiring about 600 watts.

Shipping weight, 332 pounds.

21. Heart Disease.

An exhibit consisting of panels showing the normal heart, with transparencies showing diseased hearts; an exposition file giving information about heart disease.

Space required, an area 10 feet wide by 6 feet deep; no background necessary; small table for exposition file.

Electrical connections, one outlet for lights in transparency case using 240 watts.

Shipping weight, 435 pounds.

24. Prevention of Eye Injuries.

An exhibit used in conjunction with the Section on Ophthalmology of the American Medical Association, consisting of miscellaneous posters on panels ready to set up. The panels are accompanied by a transparency case showing transparencies of various eye injuries.

Space required, an area 10 feet wide by 6 feet deep; no background necessary.

Electrical connections, three outlets, with a total of about 400 watts.

Shipping weight, 240 pounds.

25. Prevention of Burns.

An exhibit used in conjunction with the Milwaukee Children's Hospital, consisting of miscellaneous posters on panels ready to set up and accompanied by a transparency case showing various injuries caused by burns. Where suitable arrangements can be made, a motion picture film on burns can be used with the exhibit. This will not be sent unless specifically requested. Motion picture, 16 mm., one reel, silent.

Space required, an area 10 feet wide by 6 feet deep; no background necessary.

Electrical connections, one outlet for lamps in transparency case using 200 watts.

Shipping weight, 240 pounds.

31. Information About Hospitals.

An exhibit from the Council on Medical Education and Hospitals consisting of a mechanical model of a hospital entrance with doors opening and shutting every three and a quarter seconds to indicate how often a patient enters a hospital in the United States; shadow boxes and miscellaneous charts.

Space required, a booth 10 feet wide by 6 feet deep with walls on which charts may be fastened.

Electrical connections, one outlet for small universal motor.

Shipping weight, about 300 pounds according to material selected.

34. Tularemia (spread and control).

An exhibit made in conjunction with Miami Valley Hospital, Dayton, Ohio, and U. S. Public Health Service, Washington, D. C., consisting of transparencies showing clinical cases of tularemia and posters on panels showing the prevalence, animal hosts, insect vectors and what to do to prevent infection. An exposition "microscope" shows the tularemic organism.

Space required, an area 10 feet wide by 6 feet deep; no background necessary.

Electrical connections, two outlets for lamps in transparency case and exposition "microscope" using 255 watts.

Shipping weight, 297 pounds.

42. "Patent Medicine" Testimonials.

An exhibit from the Bureau of Investigation consisting of posters showing testimonials for "patent medicines" with the death notice of the person in the same copy of the newspaper, or the death certificate dated some weeks or months previously. Two visitor participation units, one with a transparent mirror showing appropriate cartoon and one with questions and answers.

Space required, a booth with back wall 10 feet wide and side walls 6 feet deep for twelve posters each 22 by 28 inches; two small tables for transparent mirror and question and answer device.

Electrical connections, two outlets alternating current, using about 150 watts.

Shipping weight, 275 pounds.

44. Cancer Death Certificates.

An exhibit from the Bureau of Investigation in conjunction with the Texas State Board of Medical Examiners, presenting some two hundred cancer death certificates from an advertising "cancer" hospital.

Space required, an area 10 feet wide by 6 feet deep; no background necessary.

Electrical connections, none.

Shipping weight, 253 pounds.

46. Food Fads.

An exhibit from the Bureau of Investigation consisting of a mechanical attention arrester, two sets of transparencies showing persons whose diet requires special attention and persons whose diet should have been more carefully regulated; six posters each 22 by 38 inches dealing with some of the popular, but foolish, food fads; an exposition file with additional information.

Space required, a booth with back wall 10 feet wide and side walls each 6 feet deep; three small tables for transparencies and exposition file.

Electrical connections, three outlets for transparency cases and small universal motor totaling about 600 watts.

Shipping weight, 389 pounds.

55. Posture.

An exhibit from the Council on Physical Therapy consisting of a manikin for visitor participation showing correct and incorrect posture; transparencies showing reasons for good posture and panels with posters showing the relation of sitting and posture, the feet and posture, the causes of poor posture and recommendations for good posture. An exposition file gives additional information.

Space required, an area 10 feet wide by 6 feet deep; no background necessary; two small tables, one for manikin and one for exposition file.

Electrical connections, three outlets for lamps in cases using a total of 440 watts.

Shipping weight, 368 pounds.

61. Medical Economics.

An exhibit from the Bureau of Medical Economics consisting of miscellaneous charts; a rack for literature showing the publications of the Bureau, two exposition files containing various items of information concerning medical economics, and an automatic bar chart showing physicians in various countries.

Space required, a booth with back wall 10 feet wide and side walls each 6 feet wide for posters; a table 10 feet long.

Electrical connections, one outlet using about 200 watts.

Shipping weight, 400 pounds.

91. Hygeia in School, Home and Library.

An exhibit presented in conjunction with *Hygeia*, the Health Magazine, consisting of five dioramas showing the use of *Hygeia* in school, home and library.

Space required, an area 10 feet wide by 3 feet deep; table 10 feet long on which to place models; no background necessary.

Electrical connections, five outlets, requiring a total of 300 watts.

Shipping weight, 260 pounds.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

INDIANA

State Medical Meeting at French Lick.—The ninety-first annual session of the Indiana State Medical Association will be held at the French Lick Springs Hotel, French Lick, October 29-31, under the presidency of Dr. Karl R. Ruddell, Indianapolis. Included among the guest speakers will be:

- Dr. Roy Wesley Scott, Cleveland, Clinical Aspects of Arteriosclerosis.
- Dr. Charles A. Flood, New York, Prognosis and Treatment in Peptic Ulcer.
- Dr. Norvelle Chappell Lamar, New York, Common Physical Disorders of Childhood.
- Lieut.-Col. Robinson Hitchcock, on the staff of the adjutant general's office, state of Indiana, The Physician's Place in the Preparedness Program.
- Dr. Edmund L. Keeney, Baltimore, The Theory and Practice of Therapeutics in Allergy.
- Dr. Austin H. Wood, Baltimore, Clinical Urology.
- Dr. Ralph R. Mellon, Pittsburgh, Sulfathiazole, the Most Complete Sulfonamide Compound: Its Mode of Action.
- Dr. Emery A. Rovenstine, New York, Circulatory Disturbances During Anesthesia.
- Dr. Joseph M. Hayman Jr., Cleveland, Diagnosis and Treatment of Acute Nephritis.
- Dr. Irvin Abell, Louisville, Ky., Diagnostic Significance of Pain in the Abdomen.
- Dr. Fred W. Rankin, Lexington, Ky. (subject not announced).
- Dr. Nicholson J. Eastman, Baltimore, Indications for Cesarean Section.
- Dr. John Stanley Coulter, Chicago, Physical Agents in the Treatment of Fractures.

The annual banquet will be Wednesday evening with Dr. Frank H. Lahey, Boston, President-Elect, American Medical Association, and Mr. Walter McCarty, Indianapolis, managing editor, *Indianapolis News*, as the speakers. The latter's subject will be "Journalistic Obstetrics." The Indiana Association of Pathologists will meet Wednesday noon, October 30. Entertainment this year will include a trap and skeet shoot, Tuesday afternoon.

IOWA

Society News.—Dr. Howard C. Naffziger, San Francisco, discussed "Muscle Changes Associated with Thyroid Disease" before the Linn County Medical Society, October 10, in Cedar Rapids. Dr. Percy S. Pelouze, Philadelphia, discussed "Present Views on Gonorrhea and Its Treatment" before the meeting of the society, September 10.—Dr. Raymond J. Jackman, Rochester, Minn., addressed the Bremer County Medical Society and the staff of Mercy Hospital in Waverly, September 23, on "Anorectal Diseases: Diagnosis and Treatment."—The Cerro Gordo County Medical Society was addressed in Mason City, September 24, by Dr. Hugh R. Butt, Rochester, Minn., on "Recent Advances in Vitamin Therapy."—Dr. Abraham G. Fleischman, Des Moines, discussed "Clinical Aspects of Calculus Disease with Reference to the Kidney and Ureter" before the Greene County Medical Society, September 12, and Dr. Earl D. McClean, Des Moines, discussed the problems of the state society in completing the survey on medical preparedness.—Dr. Victor B. Buhler, Kansas City, Mo., gave a lecture and demonstration of laboratory procedures, assisted by Dorothy Dixon, M.T., Kansas City, before the Ninth Council District Medical Society, September 10. They demonstrated the micropothrombin test, pneumococcus typing by mouse injection, Aschheim-Zondek test by rabbit injection, injection of the guinea pig for tuberculosis and blood cultures. Physicians were present from Lucas, Wayne, Marion, Monroe, Warren and Appanoose counties.

KANSAS

Prize Essay Award.—The Sedgwick County Medical Society has approved a plan to award to a member of the society a cash prize of \$50 and a plaque for writing the best scientific paper of the year. The first award will be made in 1941. Competition is open to all members of the society and the papers are to deal with original work accomplished while the author is a member of the society. The essays must be in the hands of the program and postgraduate study committee not later than Oct. 1, 1941. Judging of the papers will be done by three members of the University of Kansas Medical School,

Drs. Ferdinand C. Helwig, Edward H. Hashinger and Thomas G. Orr, Kansas City, Mo. The papers, when presented to the judges, will be identified by number only. The winning essay is to be read before the first December meeting of the society and will be published as the Sedgwick County Medical Society Prize Essay.

MASSACHUSETTS

Mental Hygiene Meeting.—The annual meeting of the Massachusetts Society for Mental Hygiene will be held at the Twentieth Century Club, Boston, November 21. Dr. Arnold L. Gesell, New Haven, Conn., will give an address entitled "The First Five Years of Life."

New England Postgraduate Assembly.—The New England Postgraduate Assembly, sponsored by the state medical societies of Massachusetts, New Hampshire, Rhode Island, Maine and Vermont, will be held, November 13-14, in the Sanders Theatre, Harvard University, Cambridge. The speakers will be:

- Dr. Robert F. Loeb, New York, The Practitioner and the Problems of Diabetes.
- Dr. Russell L. Haden, Cleveland, Factors in the Production of Anemia.
- Dr. Sumner L. S. Koch, Chicago, Treatment of Injuries of the Hand.
- Dr. Henry W. Cave, New York, The Medical and Surgical Management of Diverticulitis of the Colon.
- Dr. Thomas Grier Miller, Philadelphia, The Causes of Indigestion and Their Recognition.
- Dr. Oliver S. Ormsby, Chicago, Fungous Infections of the Skin.
- Dr. Percy S. Pelouze, Philadelphia, The Urinary Bladder in Health and Disease.
- Dr. Fred L. Adair, Chicago, Management of Preeclampsia in Private Patients.
- Dr. Ralph M. Waters, Madison, Wis., Treatment of Respiratory Depression.
- Dr. Tracy J. Putnam, New York, Examination of the Nervous System.

At the dinner, Wednesday evening, with Dr. Reginald Fitz, Boston, as toastmaster, Dr. Harrison S. Martland, Newark, N. J., will speak on "Dr. Watson and Mr. Sherlock Holmes."

MICHIGAN

Society News.—Dr. Nathan B. Van Etten, New York, lectured before the Wayne County Medical Society, Detroit, October 7; his subject was "Medical Horizons."—Dr. Jean P. Pratt, Detroit, discussed "Pelvic Lesions Simulating Appendicitis" before the Calhoun County Medical Society in Battle Creek, September 3.—The Michigan Society for Crippled Children will hold its nineteenth annual convention in Kalamazoo, November 14-16. Additional information may be obtained from the Executive Secretary, 548 Buhl Building, Detroit.—Dr. Richard McKean, Detroit, discussed "Common Cardiac Disorders" before the Washtenaw County Medical Society in Ann Arbor, September 10.

Venereal Disease Clinic.—The second venereal disease clinic day of the Ingham County Medical Society will be held at the Hotel Olds, Lansing, November 7. The theme of this year's meeting will be gonorrhea, and speakers will include:

- Dr. Raymond A. Vonderlehr, U. S. Public Health Service, Washington, D. C., Morbidity and Mortality Rates in Gonorrhea, Immediate and Remote.
- Dr. Adolph Jacoby, New York, Diagnosis and Criterion of Cure.
- Dr. Percy S. Pelouze, Philadelphia, Treatment of Gonorrhea in the Male.
- Dr. Vincil Rogers Deakin, St. Louis, Treatment of Gonorrhea in the Female.

Dr. Vonderlehr will address a public meeting in the evening on "Present Day Venereal Disease Control."

MINNESOTA

Mr. Awe Fined.—William F. Awe, aged 53, who gave Denver as his home address, was sentenced, September 21, by Judge Vernon Gates of the district court at Rochester to pay a fine of \$1,000 for practicing healing without a basic science certificate. It was ordered that Awe be confined in the Olmsted County Jail until such time as the fine is paid, not exceeding six months. He was taken to jail since he was unable to pay the fine. Awe, who stated that he was one fourth Cherokee Indian, was arrested, September 14, after it was discovered that he was treating an 8 months old baby in Chester, Iowa, for eczema. He used mineral water and mineral earth, which he claimed was a cure for blindness, cancer, eczema, rheumatism, kidney trouble and many other ailments. Awe sold the mineral water at \$15 a gallon and the mineral earth at \$1 for a 4 ounce jar. The water cost him 35 cents a gallon and he obtained the earth at no expense, it was reported. He admitted that he had no training in medicine, pharmacy or any other form of healing.

MISSOURI

Society News.—The St. Louis Medical Society was addressed, September 20, by Drs. Grayson L. Carroll and Louis C. Kappel on "Sulfathiazole: A Clinical Report"; Neil S. Moore, "Cryptorchidism: Surgical Correction," and Robert W. Bartlett, "Bilateral Intercostal Nerve Block for Upper Abdominal Surgery." All are of St. Louis.

Lectures on Dermatology.—A series of lectures on dermatology opened on October 3 under the auspices of the St. Louis City Hospital number 1. Dr. Charles H. Neilson discussed "Relation of Dermatology to Internal Medicine." Dr. Joseph B. Grindon Jr., St. Louis, gave the second lecture, October 10, on "Diseases of the Scalp." October 17 Drs. Richard S. Weiss and Newell W. Schlueter discussed "The Erythemas" and "The Purpuras," respectively. Others in the series include the following St. Louis physicians:

- Drs. Martin Engman Jr. and Clinton W. Lane, October 24, Cutaneous Therapeutics.
- Dr. LeRoy Sante, October 31, X-Ray and Radium Therapy: Its Place in Dermatology.
- Drs. Adolph H. Conrad Sr. and Alexander J. Kotkis, November 7, Leg Ulcers: Classification and Treatment, and Physiotherapy—Its Use in Dermatology, respectively.
- Dr. Garold V. Stryker, November 21, Drug Eruptions.
- Dr. Norman Tobias, November 28, The Eczema and Eczematoid Eruptions.
- Dr. August A. Werner, December 5, Endocrines in Relationship to Dermatology.
- Dr. Lane, December 12, Fungous Infections: Classification, Treatment.

NEBRASKA

Mid-West Clinical Society.—The eighth annual assembly of the Omaha Mid-West Clinical Society will be held at the Hotel Paxton, Omaha, October 28-November 1, under the presidency of Dr. Charles McMartin. The speakers will include:

- Dr. Samuel Ayres Jr., Los Angeles, The Problem of Acne and Seborehical Conditions.
- Dr. Paul C. Colonna, Oklahoma City, Amputations in the Lower Extremities.
- Dr. John T. Murphy, Toledo, X-Ray Treatment in Cancer of the Skin.
- Dr. Reginald Fitz, Boston, The Changing Picture of Diabetes Mellitus.
- Dr. Verne C. Hunt, Los Angeles, Acute Conditions of the Abdomen.
- Dr. Horton R. Casparis, Nashville, Tenn., Gastrointestinal Allergy of Infants and Children.
- Dr. William E. Ladd, Boston, Acute Conditions of the Abdomen in Infancy.
- Dr. Wendell S. Muncie, Baltimore, The General Practitioner's Stake in Psychiatric Therapy.
- Dr. Harold I. Lillie, Rochester, Minn., Acute Infections of the Upper Respiratory Tract.
- Dr. George R. Herimann, Galveston, Texas, The Clinical Study of Patients.
- Dr. Joseph L. Baer, Chicago, Office Gynecological Practice.
- Dr. Roy R. Kracke, Emory University, Ga., The Toxic Effect of Drugs on the Blood.
- Dr. Frank J. Heck, Rochester, Minn., Clinical Diagnosis of the Anemias, Exclusive of Blood Studies.
- Dr. Willis M. Fowler, Iowa City, Iron Deficiency Anemias.
- Dr. Frank H. Bethell, Ann Arbor, Treatment of Pernicious Anemia.
- Dr. George M. Curtis, Columbus, Ohio, Rationale of Splenectomy in the Treatment of Certain Anemias.

In addition to the presentation of papers there will be round table discussions, clinics, lecture courses, dinner discussions and motion pictures. Thursday evening will be devoted to a meeting with the Omaha-Douglas County Medical Society; the speakers will include Chauncey S. Boucher, Ph.D., chancellor of the University of Nebraska, Lincoln, on "Perspective in Professional and General Education." Friday morning will be given over to a symposium on the anemias.

NEW JERSEY

Activities of State Medical Board.—The New Jersey Board of Medical Examiners reported the following activities of recent months:

- Dr. John F. Zielinski, Trenton, license revoked.
- Lorenzo Bello, Newark, sentenced to ten days in jail for practicing medicine without a license.
- Felicia Kornreich, Paterson, paid a penalty for practicing medicine without a license.
- Lillian Prien, Hackensack physiotherapist, paid a penalty for practicing medicine without a license.
- Gustino Coppola, Paterson pharmacist, paid a penalty for practicing medicine without a license.
- Lucia Raffone, a midwife of Newark, paid a penalty for practicing medicine without a license.
- Jack E. Allbaugh, unlicensed chiropractor of East Orange, pleaded guilty to practicing medicine without a license.

NEW MEXICO

New Director of Public Health.—Dr. James R. Scott, Albuquerque, has been appointed state director of public health. The position has been vacant for several months since Dr. Edwin B. Godfrey, Santa Fe, resigned on account of ill health. Dr. Scott, who has been professor of health education at the University of New Mexico, graduated at Cooper Medical College in 1912.

NEW YORK

Postgraduate Work Expanded.—The council committee on public health and education of the Medical Society of the State of New York has expanded its medical education program with a plan for "Teaching Days." A "Teaching Day" may be devoted to a single subject or to several subjects, with clinics conducted by eminent specialists in their fields on the afternoon of the day selected, and an evening meeting, when the visiting physicians lecture and present their subjects for general discussion. Dr. Homer F. Swift, New York, conducted such a program for the Onondaga County Medical Society, Syracuse, October 1, on rheumatic fever in cooperation with the state department of health. A similar program was presented in Rochester, October 9, for the Medical Society of the County of Monroe, with the following speakers: Drs. Russell L. Cecil, New York, on "Arthritis"; Samuel Kleinberg, New York, "Backache," and William J. Merle Scott, Rochester, "Thyroid Diseases." Dr. Oliver W. H. Mitchell, Syracuse, is chairman of the council committee.

New York City

Personal.—The library of the late W. T. H. Howe, Cincinnati, president of the American Book Company, was recently bought from his estate by Dr. Albert A. Berg and presented as a gift to the New York Public Library. The late Mr. Howe was said to have spent forty years and more than \$2,000,000 in assembling the collection. This is the second collection presented to the public library by Dr. Berg. In February he gave a group assembled by himself and his brother, the late Dr. Henry W. Berg, and, in addition, established a trust fund for its administration and care. Like the first collection, the second has been presented by Dr. Berg as a memorial to his brother.

Promotions at Long Island College.—Dr. Joseph B. L'Episcopo has been promoted to be professor of clinical orthopedic surgery at Long Island College of Medicine, succeeding Dr. Jacques C. Rushmore, who was made emeritus professor. Other promotions announced include:

- Dr. Eli Jefferson Browder, clinical professor of surgery, neurology and psychiatry.
- Drs. Stanley S. Lamm and Lewis A. Koch, clinical professors of pediatrics.
- Dr. Abraham M. Rabiner, clinical professor of neurology and psychiatry.
- Dr. Elliston Farrell, assistant clinical professor of medicine.
- Dr. Gaetano A. De Yoanna, assistant clinical professor of surgery.
- Drs. Lavin Milford Andersen and Emanuel Mendelson, assistant clinical professors of radiology.

OHIO

Faculty Changes at Western Reserve.—The following promotions in the medical faculty of Western Reserve University School of Medicine, Cleveland, among others, were announced recently:

- Dr. Claude S. Beck, to be professor of neurosurgery.
- Dr. John A. Toomey, professor of clinical pediatrics and contagious diseases.
- Dr. William R. Barney, associate clinical professor of obstetrics.
- Dr. Harold D. Green, associate professor of physiology.
- Dr. Maxwell Harbin, associate clinical professor of orthopedic surgery.
- Dr. James J. Joelson, associate clinical professor of genito-urinary surgery.
- Dr. Robert F. Parker, associate professor of medicine.
- Dr. Roger O. Egeberg, assistant clinical professor of medicine.
- Dr. Roscoe D. Leas, assistant clinical professor of medicine.
- Dr. Joseph E. McClelland, assistant clinical professor of pediatrics.
- Dr. Floyd S. Mowry, assistant clinical professor of obstetrics.
- Dr. Donald J. Rehbock, assistant professor of pathology.
- Dr. Robert M. Stecher, assistant clinical professor of medicine.

Drs. David Bodian, Baltimore, and Ernst A. Scharrer, New York, were appointed assistant professors of anatomy, among other new appointments. Dr. Bruno Gebhard, recently appointed director of the new Cleveland Museum of Hygiene, was appointed associate in health education.

OREGON

Society News.—Dr. Robert Yorke Herren, Portland, addressed the Polk-Yamhill-Marion Counties Medical Society at its September meeting on "Recognition and Treatment of Acute Craniocerebral Injuries."—Dr. Reuben H. Fields, Reedsport, addressed the Coos and Curry County Medical Society in Marshfield in September on "Cholera in China."—Dr. Ludvig Hektoen, Chicago, addressed the Portland Academy of Medicine, September 23 and 24, on "Trends of Fundamental Cancer Research" and "The Control of Cancer."

PENNSYLVANIA

State Medical Election.—Dr. Lewis T. Buckman, Wilkes-Barre, was chosen president-elect of the Medical Society of the State of Pennsylvania at its recent annual meeting in Philadelphia and Dr. Francis F. Borzell, Philadelphia, was installed as president. Other officers include Drs. John Hart

Toland, Philadelphia; Christian Gruher, Shenandoah; Walter S. Brenholtz, Williamsport, and Walter J. Stein, Ardmore, vice presidents; Dr. John B. Lowman, Johnstown, treasurer, and Dr. Walter F. Donaldson, Pittsburgh, secretary.

Philadelphia

Hospital News.—The seventy-fifth anniversary of the founding of the Jewish Hospital was celebrated at a dinner at the Bellevue-Stratford, September 23. Dr. Benjamin W. Black, Oakland, Calif., president of the American Hospital Association, delivered the principal address, discussing the hospital's position in civilization. More than 700 persons attended the dinner.

Dr. McFarland Named to Dental School.—Dr. Joseph McFarland, emeritus professor of pathology and bacteriology, University of Pennsylvania School of Medicine, has been appointed professor of general pathology at the school of dentistry of Temple University. A native of Philadelphia, Dr. McFarland graduated at the University of Pennsylvania School of Medicine in 1889. During his career he has served, among other positions, as professor of pathology at the Woman's Medical College of Pennsylvania, professor of pathology and bacteriology at the Medico-Chirurgical College of Philadelphia, continuing at the University of Pennsylvania after it took over the former school, organizer and director of the Mulford Biological Laboratory, 1894-1900, and secretary of the Section on Pathology of the American Medical Association, 1901-1903, and chairman, 1903-1904.

TEXAS

Personal.—Dr. Neil D. Buie, Marlin, president-elect of the State Medical Association of Texas, was guest of honor at a dinner and reception given by Dr. Charles M. Rosser, Dallas, September 13, to the Dallas County Medical Society. Speakers at the dinner included Drs. Thomas J. Crowe, Dallas, secretary of the state board of medical examiners, Holman Taylor, Fort Worth, secretary of the state medical association, Preston Hunt, Texarkana, president, and Dr. Buie.

Annual Fort Worth Clinics.—The annual Fort Worth Medical and Surgical Clinics presented by the Tarrant County Medical Society were held, September 24, at the Hotel Texas. The guest speakers were:

- Dr. Karl A. Menninger, Topeka, Kan., A Scientific Study of the Personality from a Medical Standpoint.
- Dr. Virgil S. Counseller, Rochester, Minn., Surgical Management of Various Types of Acute Intestinal Obstruction.
- Dr. Willard R. Cooke, Galveston, Retroversion.

At a banquet in the evening Dr. Menninger made an address entitled "Some Thoughts of a Psychiatrist Concerning War."

GENERAL

The Casselberry Prize.—The Casselberry Prize Fund of the American Laryngological Association has available \$150 to be given as an award for original work done in laryngology and rhinology. The thesis must be submitted before February 1. Further information may be obtained from Dr. Charles J. Imperatori, secretary of the association, 108 East Thirty-Eighth Street, New York.

Association of Food and Drug Officials.—The forty-fourth annual conference of the Association of Food and Drug Officials of the United States will be held at the Jung Hotel, New Orleans, October 22-25. Among the speakers will be:

- Dr. Erwin E. Nelson, New Orleans, Biologic Assays and Enforcement Activities.
- Mr. W. G. Campbell, Washington, D. C., Progress in Food, Drug and Cosmetic Control Under the New Federal Food, Drug and Cosmetic Act.
- Mr. E. L. Redfern, department of agriculture, Des Moines, Iowa, Locker Plants and Frozen Foods.
- Mr. Guy G. Frary, state chemist, Vermillion, S. D., Role of the Food and Drug Control Official in National Emergency.
- Dr. Alfonso E. Taylor, General Mills, Inc., Minneapolis, The Changing Picture of World Food Supplies.

Position Open as Director of Birmingham Hospital.—A nationwide examination will be held to fill the position of director of the new Jefferson Hospital in Birmingham, Ala. Applications may be secured from the Personnel Board of Jefferson County, Room 520, Courthouse, Birmingham. The entrance salary will be \$6,000 a year, subject to increase as the successful operation and expansion of the new hospital may justify. Tenure of office shall be at the pleasure of the county commission during the probationary period of twelve months from date of appointment, after which the appointee shall attain civil service status. Applicants shall be male citizens of the United States, within the age limits of 32 and 48

years. Preference will be given to citizens of Jefferson County who qualify. Among other things, the applicant shall have had not less than five years' experience as administrator of an approved general hospital with an average occupancy of not less than 150 patients and caring for both private and charity patients.

Plastic and Reconstructive Surgery.—The ninth annual meeting of the Society of Plastic and Reconstructive Surgery will be held at the Stevens Hotel, Chicago, October 25-26, under the presidency of Dr. Arthur Palmer, New York. The speakers will include:

- Dr. Palmer, The Development of Plastic Surgery; the Need for Improvement in Instruction.
- Dr. William Milton Adams, Memphis, Tenn., Fractures of Maxilla and Use of a New Appliance.
- Dr. Jacques W. Malinac, New York, Plastic Surgery in Warfare.
- Dr. George V. I. Brown, Milwaukee, Problems That Confronted a Plastic Surgeon in This Country During the First World War.
- Dr. Fred H. Albee, New York, Plastic Repair of Ununited Fractures of the Neck of the Femur (motion pictures).
- Dr. Harold R. Browne, Marjolin's Ulcer in Burns.
- Dr. Vilray P. Blair, St. Louis, Experiences in Plastic Surgery During the World War.
- Dr. Robert J. Alexander, Salt Lake City, Correction of Facial Paralysis by Muscle Transplant.
- Dr. Earl C. Padgett, Kansas City, Mo., Compound Injuries of the Face, Mouth and Jaws.
- Dr. Lyndon A. Peer, Newark, N. J., The Fate of Autogenous Septal Cartilage After Transplantation in Human Tissues.
- Dr. Chaire L. Straith, Detroit, Treatment of Facial Wounds Due to Explosions.

Mead Johnson & Company B Complex Award.—Nominations are solicited for the 1941 award of \$1,000 established by Mead Johnson & Company to promote researches dealing with the B complex vitamins. The recipient of this award will be chosen by a committee of judges of the American Institute of Nutrition and the formal presentation will be made at the annual meeting of the institute in Chicago April 16, 1941. The award will be given to the laboratory (nonclinical) or clinical research worker in the United States or Canada who, in the opinion of the judges, has published during the calendar year January 1 to December 31, 1940, the most meritorious scientific report dealing with the field of the B complex vitamins. While the award will be given primarily for publications of specific papers, the judges are given considerable latitude in the exercise of their function. If circumstances dictate, it may be recommended that the prize be divided between two or more persons. It may also be recommended that the award be made to a worker for valuable contributions over an extended period but not necessarily representative of a given year. Membership in the American Institute of Nutrition is not a requisite of eligibility for the award. To be considered by the committee of judges, nominations for this award for work published in 1940 must be in the hands of the secretary by Jan. 25, 1941. The nominations should be accompanied by such data relative to the nominee and his research as will facilitate the task of the committee of judges in its consideration of the nominations. Leonard A. Maynard, Ph.D., Laboratory of Animal Nutrition, Cornell University, Ithaca, N. Y., is the secretary of the institute.

Government Services

Public Health Service Needs Bacteriologists

The U. S. Civil Service Commission announces competitive examinations for bacteriologists for the U. S. Public Health Service. The grades included in the examination are associate bacteriologist, \$3,200 a year, and assistant bacteriologist at \$2,600 a year, less a retirement deduction of 3.5 per cent. Appointments will be made for the staff of the Rocky Mountain Laboratory at Hamilton, Mont., and other places. Applications must be filed with the commission's Washington office not later than November 12 if received from states east of Colorado, and not later than November 15 if received from Colorado and states westward. Applicants must have completed a four year college course, including twenty-four semester hours of study in bacteriology, and, in addition, postgraduate study or experience in advanced bacteriologic work. Applicants will be rated on their qualifications as shown in their application and on corroborative evidence and not on a written test. Further information may be obtained from the secretary of the Board of U. S. Civil Service Examiners at any first or second class post office or from the U. S. Civil Service Commission, Washington, D. C.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 21, 1940.

The Attacks on London from the Air

Sporadic raids have been followed by daily attacks on London since September 7, which have caused considerable damage to property and casualties which, though serious, are small for the population of 8 million. The reason is that our defenses are so good that they have prevented massed attacks by breaking up these before they reach the capital. Hence most of the damage is done by a few night raiders, whose bombing is indiscriminate. The following official figures are available: During the first half of September about 2,000 civilians, men and women and children, were killed in Britain in air raids and about 8,000 were wounded. Four fifths of these casualties occurred in London. The indiscriminate nature of the attacks is shown by the fact that only 250 of the 10,000 casualties occurred in the fighting forces. Many of the great hospitals of the metropolis have been damaged. The largest hospital, the London, was hit by three bombs in a fortnight. A high explosive shell fell in a yard between the physical medicine department and a first aid post. The only casualties were two nurses, who were slightly hurt by splinters. At the Westminster Hospital, which specializes in radium treatment, two radium bombs containing 6 Gm. are in use. Every time the London sirens sound a warning, which now occurs several times in the twenty-four hours, these bombs are lowered to the bottom of a 50 foot well, where they remain in safety until the "all clear" is sounded. High voltage roentgen treatment has also had to stand by during the raids. The hospitals have also suffered from incendiary bombs, and doctors and nurses have helped in the extinction of the fires caused.

The bearing and spirit of the Londoners under the ordeal has won the admiration of visitors from other countries. They show the toughness and tenacity characteristic of the British in the face of danger. From all over the metropolis come stories of the heroism of doctors and nurses in the dangerous work of helping the injured during air raids. Not only are medical services working efficiently but the government has made every provision for those rendered homeless by the destruction of their dwellings, providing billets and food. In normal times the authorities have to do all that is possible to maintain the health and well-being of an enormous population living under artificial urban conditions. War has produced new problems on a large scale and our services are bearing the strain well. Our whole system of life and labor is being rapidly adapted to conditions hitherto unknown to modern society. Damage of roads and of water, gas and electrical power mains have to be quickly remedied. While the transport system of London is generally working well, of course there are some inconveniences. Thus a delayed action bomb has put a railway station out of use. The difficulty is surmounted by making the railway tickets available for road transport corresponding to a section of the line. Contrary to enemy statement, the food supply of London is abundant and the now controlled distribution works without any friction.

Drug Restriction from the War

The policy of the government is that tonnage and foreign currency should not be used to import drugs which are not essential or for which substitutes can be obtained at home. An advisory medical committee has prepared lists of drugs classified as follows: (1) essential drugs, (2) drugs essential for certain purposes but the use of which should be restricted

and (3) nonessential drugs, which should not be imported or manufactured in wartime. A long list of the first class includes glycerophosphoric acid, tartaric acid, tolu balsam, apocynum, cantharides, cinnamon, copaiba, jalap, senega, strophanthus, tamarind, taraxacum and camphor. In a number of cases substitutes are suggested. Thus, in place of aconite, ethyl aminobenzoate is suggested for local application. For buchu, copaiba, cubeb and santal oil are suggested sulfanilamide, methenamine, mandelic acid, sodium benzoate and scoparius. Hydrochloric acid and sodium bromide may be used for hydrobromic acid; citric for tartaric acid; quassia for calumba and gentian; mustard for cantharides; dill for caraway seed; male fern and carbon tetrachloride for kousso and pelletierine tannate; synthetic analgesics for gelsemium; tannic acid for hamamelis and krameria; colocynth for jalap; sodium salicylate for stramonium; turpentine for camphor oil; methyl salicylate for salicin; Indian squill for squill; iodides, ammonium carbonate and ammonium chloride for senega, and digitalis for strophanthus.

The Food Situation in Europe

As stated in previous letters, the supply of food in Britain is plentiful, thanks to our command of the sea and to increased agricultural production. Meat, sugar and butter are rationed, but this is only a small inconvenience, as other foods are unrestricted. But on the European continent the ravages of war have impaired production and now the enslaved peoples are being ruthlessly plundered by the invaders, so that there

Weekly Rationing, in Ounces, of Germany and Countries Occupied by German Forces

	Bread	Meat	Sugar	Fats	Coffee
Germany.....	80	17½	8	10½	3½ (substitute)
Protectorate....	44	17½	10½	5½	3½
Poland.....	35	9	5½	2½	?
France.....	Restricted	Restricted	4½	2	Restricted
Denmark.....	Restricted	Restricted	13	4	Restricted
*Norway.....	Restricted	Restricted	9	10½	1½
*Netherlands....	71	Restricted	9	4½	1½
Belgium.....	56	Restricted	7½	13½	3

* Supplies usually not equal to official rations.

is privation even in the countries which normally are great food exporters. The accompanying table, published by the *Times*, gives the weekly rationing in ounces and shows the disparity between the German rations and those of the enslaved peoples. Later information supplies the following figures for France: meat 12½ ounces and cheese 1½ ounces weekly; bread 12¼ ounces daily; sugar 17½ ounces and rice 3½ ounces monthly. In every country that they have overrun the Germans have commandeered outright nearly all the food reserves and ordered slaughtering of much of the livestock. During the week of September 16 to 22 alone Germany took from the little country of Denmark, without even the pretext of war, 17,000 sheep and 11,000 head of cattle. Holland lost nine tenths of her large butter reserves in a week and out of 28,000,000 poultry 22,000,000 are ordered to be slaughtered this autumn. Only the other day the German wireless boasted that Germany had taken 43,000,000 Kg. of early potatoes from the Netherlands in three months. From Norway Germany takes 200 tons of fish daily and from Belgium all the available eggs, the Belgian producers having been warned of penalties should they sell without a German controlled license. From the enslaved countries Germany has added 2,000,000 tons of wheat to her reserves and has just demanded 780,000 tons from France. These facts, which might be multiplied, should be remembered when German propaganda states that the food shortage of enslaved Europe in the coming winter is due to the British blockade.

BUENOS AIRES

(From Our Regular Correspondent)

Sept. 13, 1940.

Care of Persons with Heart Disease

Extensive statistically supported studies have been made by Dr. Rafael A. Bullrich, professor of internal medicine in Buenos Aires, on the incidence of heart disease in persons over 60 years of age. The mortality rate from circulatory diseases at all age levels for the last ten years amounted to 29 per cent of the general death rate; for persons between 60 and 80 years it rose to 43.38 per cent. If deaths from chronic nephritis are included, and these are caused almost altogether by heart disease in persons past 60, the mortality rate for 1939 from heart disease was as high as 47 per cent for this age group. It is assumed that in Argentina's total population of about 13,500,000 there are about 540,000 persons 60 years and older. Including latent cases in which exertion is an involving factor only on a small scale, it is estimated that more than 44 per cent of these, about 237,000, suffer from cardiac lesions. At any rate the high percentage of those affected discloses the social significance of this disease. The fact that institutions cannot provide sufficient beds does not make the problem easier for the families. Members of pension funds, such as state employees, are better off. According to Bullrich's previous investigations, more than 40 per cent of those receiving pensions from funds such as working men's insurance funds and railroad pension funds have been retired because of circulatory diseases, and the morbidity rate seems to be on the increase. Many who have contracted cardiac abnormalities through a life of struggle and strain and are not members of pension funds are helpless if without means, since there are no state provisions such as exist in Uruguay with its pension law for the aged, in the United States of America and in several European countries where social welfare laws in some form or other benefit aged persons with heart trouble. This problem is all the more pressing as the number of the aged is increasing in Argentina. Bullrich favors old age insurance, the costs of which are to be defrayed by a special tax as a preliminary step, until fuller plans of social legislation can be worked out.

The Asistencia social del cardíaco, a voluntary organization founded in 1938 for the purpose of aiding persons with heart disease and directed by Bullrich, arranges hospitalization when necessary, takes care of pregnant women, nursing mothers and children with cardiac lesions, and vocationally guides the latter. It seeks to provide homes for those completely disabled, for those for whom their nearest relatives cannot care and for those who, though improved, need continued care. It promotes the organization and equipment of dispensaries and colonies, urges increased legislation favoring workers and employees affected with disorders of the heart, furthers special schools of vocational training and arranges locations where articles made can be sold. The Asistencia social del cardíaco, under the control of the Public Aid of the city of Buenos Aires, has so far called into being nine dispensaries that are housed in the different hospitals of the city. In this work it has the cooperation of the Asociación de damas cooperadoras de la asistencia social al cardíaco. This group of cooperating women pays the rentals, distributes medicines, food and clothing and sends children of incapacitated persons into summer camps. Funds are raised by voluntary offerings on annual tag days.

Recently a society for the study of social aid to cardiac persons, also under the direction of Bullrich, was organized. It includes the physicians who are active in the dispensaries and those consulted by the Public Aid in problems concerning rheumatism. The first national congress dealing with social

problems arising from heart disease will meet during the month of November in Buenos Aires. Physicians from Brazil and Uruguay will participate.

Medical Research Institute of Colombia

The Federico Lleras Institute of Medical Investigation in Bogotá, Colombia, named after its founder, Prof. Federico Lleras Acosta, and since 1934 under the direction of Dr. Luis Patiño Camargo, is chiefly engaged in leprosy research, though not entirely so. It has departments of bacteriology, serology, biochemistry, pathologic anatomy, clinics and therapy. It tests the scientific results achieved in other countries and examines new therapies. The institute recently moved into specially designed quarters, composed of three wings housing the laboratories and the clinics. Its annual budget amounts to 30,000 Colombian pesos (about \$17,000).

Association of Argentine Hospitals

Argentina's delegates to the Hospital Congress that met in Toronto in September 1939 have officially submitted recommendations counseling the organization of the Asociación argentina de hospitales, to include existing hospital associations. The other Spanish-American countries are likewise to be encouraged to form similar organizations. Organization plans under the direction of Dr. José W. Tobías, president of the Public Aid of Buenos Aires, are already under way. The association will not be concerned with scientific matters but only with purely administrative problems.

Society News

The third Chilean and American Congress for Surgery (Congreso Chileno y Americano de Cirugía) will meet in February 1941 on the occasion of the four hundredth anniversary of the founding of Santiago. Papers will be read also by physicians from Argentina, Uruguay and Peru.

The second American Congress for Endocrinology will meet in Montevideo, Uruguay, March 5 to 8, 1941. This congress has the active support of the government. The arrangement committee is headed by Dr. Juan C. Mussio Fournier, minister of public health.

In Santiago de Chile a new building is being erected for the Bacteriologic Institute of Chile. It is planned on a large scale and will have laboratories for the study of vitamins and hormones besides departments of bacteriology, serology, biochemistry and chemotherapy. Dr. E. Friedheim, privatdozent of the University of Geneva, has been invited by the ministry of public health to organize the chemical division.

Marriages

ALBERT MAXWELL BETCHER, Jersey City, N. J., to Miss Gertrude Weinberger of New York, September 22.

FRANCIS BENEDICT LANAHAN, Narberth, Pa., to Miss Rita Virginia Byrne of Phoenixville, September 14.

GEORGE EDMUND STONE, Staunton, Va., to Miss Frances Elizabeth Fitzpatrick of Radford, July 27.

FRANKLIN P. LE VAN, Chicago, to Dr. GRACE C. ILIFF of Ottawa, Ill., in St. Louis, September 5.

EDWARD SCHUMACHER to Miss Margaret Stucky, both of Cleveland, in Lakewood, Ohio, July 20.

JAMES M. HINDLEY to Miss Marjorie Stewart, both of Monroeville, Ohio, at Pittsburgh in June.

ERWIN EMANUEL PETERS to Miss Ann Katherine Harris, both of Baltimore, September 9.

JOSEPH J. NOTO, Baton Rouge, La., to Miss Angelina Marie Macheca of New Orleans, July 31.

LYNNE E. BAKER, Cincinnati, to Miss Elizabeth Titus of Fond du Lac, Wis., September 5.

ALLEN H. BUNCE to Miss Isabella Washington Arnold, both of Atlanta, Ga., June 12.

Deaths

Francis Park Lewis * Buffalo; Pulte Medical College, Cincinnati, 1876; member of the American Academy of Ophthalmology and Otolaryngology, American Ophthalmological Society, Association for Research in Ophthalmology, French Ophthalmological Society and the German Ophthalmological Society; fellow of the American College of Surgeons; past president of the Buffalo Academy of Medicine; was chiefly responsible for the founding of the National Society for the Prevention of Blindness in 1908 and the International Association for Prevention of Blindness in 1929; served as vice president of both organizations since their founding; in 1928 was awarded the Leslie Dana Gold Medal by the St. Louis Society for the Blind in recognition of outstanding achievements in the prevention of blindness and the conservation of vision; received a special gold medal from the International Association for the Prevention of Blindness in London in April 1939; in 1933 received the chancellor's medal from the University of Buffalo, awarded annually to the citizen considered most deserving of community recognition; ophthalmic surgeon to the Millard Fillmore Hospital; oculist to the Buffalo State Hospital; consulting ophthalmologist to the Buffalo City and Erie County hospitals, Buffalo, and the J. N. Adam Memorial Hospital, Perrysburg; president of the New York School for the Blind, Batavia, for many years; one of the editors of the *American Journal of Ophthalmology*; author of books, and of many papers in scientific journals, as well as the translator into English of many scientific articles from the German, French, Italian and other languages; one of the contributors to the American Encyclopedia of Ophthalmology; ophthalmic examiner during the World War; aged 85; died, September 10, in the Mather Memorial Hospital, Port Jefferson.

Phoebus A. Theodore Levene, New York; Imperial Military Medical Academy, St. Petersburg, Russia, 1891; in 1905 assistant in chemistry and since 1907 member, Rockefeller Institute for Medical Research; associate in chemistry at the State Pathological Institute of New York from 1896 to 1905; chemist to the Saranac Laboratory for the Study of Tuberculosis, Saranac Lake, N. Y., from 1900 to 1902; Herter lecturer of pathologic chemistry at the New York University, 1905-1906; received the Willard Gibbs Medal from the Chicago Section of the American Chemical Society in 1931 and the William H. Nichols Medal from the New York Section of the American Chemical Society at the meeting in 1938; was a member of numerous scientific societies; author of papers and monographs; aged 71; died, September 6, of coronary occlusion.

George Washington Goler, Rochester, N. Y.; University of Buffalo School of Medicine, 1889; medical inspector, board of health of Rochester, from 1892 to 1896 and health officer from 1896 to 1932; was lecturer in preventive medicine at the University of Rochester School of Medicine and Dentistry; served during the World War; was largely responsible for the erection of the Municipal Hospital; honorary president of the fourth section of the International Congress of Child Hygiene in Berlin, Germany; member of the board of managers of the New York State Industrial School from 1896 to 1900; aged 76; died, September 18, in the Strong Memorial Hospital of hemorrhage due to duodenal ulcer and bronchopneumonia.

Thomas Leidy Rhoads * Colonel, U. S. Army, retired, Boyertown, Pa.; Jefferson Medical College of Philadelphia, 1893; was an assistant surgeon in the U. S. Navy from June to November 1898; entered the army as an assistant surgeon in 1900 and was promoted through the various grades to that of colonel in 1926; retired May 31, 1931, at his own request after thirty years' service; veteran of the Spanish American War; was awarded the Distinguished Service Medal for service during the World War; fellow of the American College of Surgeons; personal physician and personal aide-de-camp to President Taft; aged 70; died, August 20, of coronary occlusion.

Cecil Dulin Gaston * Birmingham, Ala.; Jefferson Medical College of Philadelphia, 1910; member of the American Proctologic Society and the Southeastern Surgical Congress; fellow of the American College of Surgeons; past president of the Jefferson County Medical Society; served in different capacities on the staff of the Hillman Hospital; on the staff of the South Highlands Infirmary; formerly on the staffs of St. Vincent's and the Baptist hospitals; served during the World War; editor of the Transactions-American Proctologic Society, 1932-1933; aged 52; died, September 12, of myocarditis and nephritis.

Mary M. S. Johnstone * Chicago; Northwestern University Woman's Medical School, Chicago, 1899; taught gynecology and obstetrics at Northwestern University from July 1900 to June 1901 and at Rush Medical College from 1908 to 1910 and again from 1913 to 1917; during the World War served as a contract surgeon from Aug. 13, 1918, to July 2, 1919; following this service she entered the Veterans Bureau; on the staff of the Veterans Administration Facility, Hines, Ill.; aged 69; died, September 1, of gastrointestinal disease.

Stephen Haskell Blodgett, South Lincoln, Mass.; Harvard Medical School, Boston, 1887; member of the Massachusetts Medical Society; at one time clinical professor of venereal diseases, Boston University School of Medicine; served during the World War; formerly member of the board of health; aged 77; was killed, September 3, at Batavia, N. Y., when the automobile in which he was riding was struck by a truck.

Charles Dwight Pullen, Mount Pleasant, Mich.; University of Michigan Homeopathic Medical School, Ann Arbor, 1892; member of the Michigan State Medical Society; for many years member of the board of education; formerly member of the state legislature; served during the World War; aged 74; died, August 27, in the Good Samaritan Hospital, Bay City, following an operation for gallstones.

Henry Madison Tolleson, Eastman, Ga.; Emory University School of Medicine, Atlanta, 1928; member of the Medical Association of Georgia; received the Crawford W. Long Memorial Prize from the Medical Association of Georgia in 1931; past president of the Ocmulgee Medical Society; on the staff of the Coleman Sanatorium; aged 37; died in August of carbon monoxide poisoning, self administered.

Harry Ellsworth Welch, Youngstown, Ohio; Western Reserve University Medical Department, Cleveland, 1885; fellow of the American College of Physicians; past president of the Mahoning County Medical Society; for many years city health officer and formerly coroner; aged 78; on the staff of the Youngstown Hospital, North Side Unit, where he died, August 12.

Margaret Pauline Harrison Bowden * New Orleans; Tulane University of Louisiana School of Medicine, New Orleans, 1919; member of the American Society of Clinical Pathologists; on the staffs of the Touro Infirmary and the Charity Hospital; aged 63; died, August 5, of myocarditis and pneumonia following influenza.

Mary Ella Dunning Rose, Orange, N. J.; Woman's Medical College of Pennsylvania, Philadelphia, 1896; member of the Medical Society of New Jersey; formerly member of the board of education; aged 68; died, August 29, in the Presbyterian Hospital, Newark, of cerebral hemorrhage.

Randolph Ora Stites, Industry, Ill.; Chicago College of Medicine and Surgery, 1916; member of the Illinois State Medical Society; served during the World War; aged 50; died, September 1, in the Marietta Phelps Hospital, Macomb, of a hemorrhage due to a gastric ulcer.

Hugh Lenox Hodge Dick * Darby, Pa.; Jefferson Medical College of Philadelphia, 1909; on the staffs of the Fitzgerald-Mercy Hospital, Darby, and the Delaware County Hospital, Drexel Hill; aged 57; died, September 11, in the Phoenixville (Pa.) Hospital of coronary thrombosis.

Ferdinand Augustus Binford, Hyannis, Mass.; Harvard Medical School, Boston, 1899; member of the Massachusetts Medical Society; for many years on the staff of the Cape Cod Hospital; aged 69; died, September 1, of chronic myocarditis and diabetes mellitus.

Alexander Angus Beaton * Franklin, N. H.; Dartmouth Medical School, Hanover, 1898; on the staff of the Franklin Hospital; formerly mayor; aged 68; died in August at Flat River, Prince Edward Island, of cerebral hemorrhage and heart disease.

William Gray Phillips Jr., New York; Long Island College Hospital, Brooklyn, 1912; served during the World War; aged 50; died, August 24, in the United States Marine Hospital, Stapleton, of rheumatic heart disease and subacute bacterial endocarditis.

Joseph Adhemar Brien, Montreal, Que., Canada; M.B., Laval University Medical Faculty, Montreal, 1890, and M.D., 1892; appointed to the municipal health service in 1921 and made superintendent in 1929, retiring in 1939; aged 71; died, July 12.

Charles Rowland Stewart, Millvale, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1899; member of the Medical Society of the State of Pennsylvania; aged 67; died, August 31, in the St. Francis Hospital, Pittsburgh.

Clarence Vernon Page, St. Paul; State University of Iowa College of Homeopathic Medicine, Iowa City, 1902; member of the Minnesota State Medical Association; aged 65; died, August 28, of pulmonary tuberculosis and arteriosclerosis.

John Coskery Wright, Augusta, Ga.; University of Georgia Medical Department, Augusta, 1908; member of the Medical Association of Georgia; professor of clinical gynecology at his alma mater; aged 57; died in August at Beaufort, S. C.

Joseph E. Smith, Brooklyn; Jefferson Medical College of Philadelphia, 1875; for many years chief medical officer of the fire department of New York City; aged 87; died, August 22, in Ridgewood, N. J., of carcinoma of the sigmoid.

Clyde Edwin King, Chicago; Chicago College of Medicine and Surgery, 1907; member of the Illinois State Medical Society; aged 67; on the staff of the Jackson Park Hospital, where he died, September 1, of myocarditis.

Thomas Lincoln Jenkins ♂ Topsfield, Mass.; Harvard Medical School, Boston, 1890; veteran of the Spanish-American and World wars; aged 73; died, July 29, in Crawford, Maine, of coronary thrombosis and arteriosclerosis.

William Earl Hutto, Atlanta, Ga.; Emory University School of Medicine, Atlanta, 1931; member of the Medical Association of Georgia; aged 36; was killed, August 31, in an automobile accident near Demopolis, Ala.

Clarence Arlington Weaver ♂ Washington, D. C.; Jefferson Medical College of Philadelphia, 1892; veteran of the Spanish-American War; aged 69; died, August 23, of acute dilatation of the heart and hypertension.

Charles Kendall Small, San Leandro, Calif.; Hahnemann Hospital College of San Francisco, 1896; Hahnemann Medical College and Hospital, Chicago, 1897; aged 64; died, August 15, of hypertension and coronary thrombosis.

Homer G. Rosenberger ♂ Whittier, Calif.; Rush Medical College, Chicago, 1907; served during the World War; fellow of the American College of Surgeons; aged 60; died, August 14, in Los Angeles of cerebral thrombosis.

Charles Gailey Brown Sr. ♂ Mansfield, Ohio; Jefferson Medical College of Philadelphia, 1901; fellow of the American College of Surgeons; on the staff of the Mansfield General Hospital; aged 65; died, September 2.

George Vincent Duffy, Queens Village, N. Y.; Fordham University School of Medicine, New York, 1912; member of the Medical Society of the State of New York; aged 55; died, September 6, of coronary thrombosis.

Philip Leibowitz ♂ Brooklyn; Long Island College Hospital, Brooklyn, 1913; member of the American Academy of Ophthalmology and Otolaryngology; on the staff of the Jewish Hospital; aged 52; died, August 29.

Michael Lester Casey, Rochester, N. Y.; University of Pennsylvania Department of Medicine, Philadelphia, 1898; served during the World War; aged 70; died, August 6, of carcinoma of the stomach.

James V. Denny, Sullivan, Mo.; Beaumont Hospital Medical College, St. Louis, 1896; aged 71; died, September 10, at the Missouri Baptist Hospital, St. Louis, of pericarditis and chronic cholecystitis with stones.

Oscar Benjamin Feldser ♂ Harrisburg, Pa.; Jefferson Medical College of Philadelphia, 1933; aged 43; on the staff of the Harrisburg Hospital, where he died, September 5, of carcinoma of the prostate.

Harlow Robert Street, Washington, D. C.; Georgetown University School of Medicine, Washington, 1891; aged 75; died, August 23, in the Sibley Memorial Hospital of uremia and chronic nephritis.

Brady B. Buck, Canton, Ohio; Western Reserve University Medical Department, Cleveland, 1902; member of the Ohio State Medical Association; aged 63; died, September 8, of coronary thrombosis.

John Henry Cipperly, Irvington, N. Y.; University of the City of New York Medical Department, 1879; for many years health officer of Troy, N. Y.; aged 83; died, July 17, of coronary occlusion.

Atwater Lincoln Douglass, Denver; Hahnemann Medical College and Hospital of Philadelphia, 1895; member of the Colorado State Medical Society; aged 71; died, August 24, in Ellsworth, Kan.

Coleman J. Eads, Oklawka, Ill.; University of Louisville (Ky.) Medical Department, 1890; member of the Illinois State Medical Society; aged 74; died, September 4, of a self-inflicted bullet wound.

John Hampton Murphey, Opal, Ark. (licensed in Arkansas in 1904); member of the Arkansas Medical Society; past president of the Polk County Medical Society; aged 62; died, August 14.

George Wesley Hall, Little Britain, Ont., Canada; M.B., University of Toronto Faculty of Medicine, 1895, and M.D., Trinity Medical College, Toronto, 1895; aged 75; died, July 7.

Welby Adams Colyer, Garrett, Ill.; Barnes Medical College, St. Louis, 1899; member of the Illinois State Medical Society; aged 66; died, September 8, of coronary thrombosis.

Russell Brooks Kilpatrick, Memphis, Tenn.; Memphis Hospital Medical College, 1901; also a druggist; served during the World War; aged 61; died, August 26, of angina pectoris.

Anson Torence Miller, Clinton, Iowa; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1904; aged 65; died, July 12, of septicemia.

William M. Kemp, Marietta, Ga.; Southern Medical College, Atlanta, 1889; member of the Medical Association of Georgia; aged 78; died, July 28, in Milledgeville.

Elam Rust Wright, Alton, N. H.; Dartmouth Medical School, Hanover, 1896; aged 73; died suddenly, August 23, at Ridgewood, N. J., of coronary occlusion.

William H. Badger, St. Louis; Homeopathic Medical College of Missouri, St. Louis, 1894; aged 74; died, September 10, of myocarditis and arteriosclerosis.

James S. Cochran, Norcross, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1901; aged 64; died, August 27, of bronchogenic carcinoma.

George Washington Willett, Atlanta, Ga.; Bellevue Hospital Medical College, New York, 1893; aged 72; died, August 13, of cardiovalvular disease.

Claude Calvin Snodgrass, Sand Fork, W. Va.; University of Louisville (Ky.) School of Medicine, 1909; aged 58; died, August 17, of cerebral hemorrhage.

Clare Montgomery Bennett, Nelson, B. C., Canada; University of Toronto Faculty of Medicine, 1933; aged 31; was accidentally drowned, July 29.

Ulysses Grant Bickell, Upper Darby, Pa.; Jefferson Medical College of Philadelphia, 1893; served during the World War; aged 75; died, August 4.

Rufus Milton Higgins, Oakland, Calif.; College of Physicians and Surgeons of San Francisco, 1901; formerly health officer; died, August 31.

George William Ogilvie Dowsley, Beaverton, Ont., Canada; University of Toronto Faculty of Medicine, 1899; aged 62; died, July 23.

Ernest Madison Burns ♂ Huntington Park, Calif.; University of Nebraska College of Medicine, Omaha, 1921; aged 46; died, August 18.

Necy Lewis Gachet, Midway, Ala.; University of Alabama School of Medicine, 1914; served during the World War; aged 49; died, August 6.

Benjamin Eugene Franklin, Pulaski, Tenn.; Barnes Medical College, St. Louis, 1896; also a minister; aged 74; died, August 27.

Oswell E. Morin ♂ Chicago; University of Illinois College of Medicine, Chicago, 1919; aged 48; was drowned, July 28, at Aurora, Ill.

Rebecca Rhoads Billings, Chicago; Northwestern University Woman's Medical School, Chicago, 1899; aged 67; died, July 3.

Elra W. Cook, Dallas, Texas (licensed in Texas by years of practice); aged 55; died, September 4, of pulmonary tuberculosis.

Albert Louis Bork ♂ West Allis, Wis.; Marquette University School of Medicine, Milwaukee, 1929; aged 41; died, July 20.

Curtis David Leister, Center Point, Ark. (licensed in Arkansas in 1903); aged 65; died, July 27, of cerebral hemorrhage.

Lysle Edward Haverfield ♂ Hardin, Mont.; St. Louis University School of Medicine, 1921; aged 44; died, July 29.

Julius Franklin Peavy Sr., Atmore, Ala.; Medical College of Alabama, Mobile, 1888; aged 79; died, July 19.

Benjamin F. Overton, Mexia, Texas; Louisville (Ky.) Medical College, 1886; aged 85; died, July 24.

Sidney J. Burnum, Scottsboro, Ala.; Medical College of Alabama, Mobile, 1887; aged 74; died, July 30.

Correspondence

INTRATHECAL ADMINISTRATION OF TETANUS ANTITOXIN

To the Editor:—In *THE JOURNAL*, September 7, page 888, appeared a review of a paper by W. M. Firor (Intrathecal Administration of Tetanus Antitoxin, *Arch. Surg.* 41:299 [Aug.] 1940). On the basis of his experiments on dogs, and the clinical reports of Yodh and of Vener, the author felt warranted in urging intrathecal injection by cisternal or lumbar routes of antitetanus serum in early mild or moderately severe tetanus instead of using intravenous routes, although he plans further investigation into the subject, using more highly purified serums. I do not feel that this recommendation should be adopted at present without serious reservation.

As Firor mentions, Dietrich records severe reactions on utilizing the intrathecal route. J. M. Wainright (Incidence and Treatment of Tetanus, *ibid.* 12:1062 [May] 1926), recognized the possibility of serious developments with intrathecal therapy, stating "The best way to increase the mortality of tetanus is to give antitoxin intrathecally." In two papers (Tetanus with Total Hemolysis, *Pennsylvania M. J.* 41:16 [Oct.] 1937, abstracted in *THE JOURNAL*, Dec. 11, 1937, page 2021, and Death in Tetanus: The Phenomenon of Toxin-Release, *Canad. M. A. J.* 38:460 [May] 1938), I reported six cases in which tetanus antitoxin serum was administered. In three of these the serum was injected intravenously, resulting in total hemolysis and death in one mild case of tetanus and in partial hemolysis in two cases of gas gangrene. In the remaining three, all of mild tetanus, antitetanus serum in addition was given intrathecally, one under chloroform anesthesia, resulting almost immediately in extremely severe "tetanismus" and death within an hour.

These reactions do not appear to have been anaphylactic or part of a serum sensitization. The late A. P. C. Ashhurst, in discussing the deaths which followed the intrathecal injection of antiserum, felt that they were not due to anaphylactic shock but rather to an unusual development of acute tetanus. In all six cases prophylactic antitetanus serum had been given at least ten days prior to active therapy. This afforded a period within which protein sensitization might occur. Only one of the six cases showed a positive reaction for serum sensitization, and routine desensitization had no effect whatever on the subsequent reactions, regardless of whether the intravenous or the intrathecal route of administration was chosen. It is to be noted, however, that intravenous injection resulted in hemolysis and cardiovascular collapse, suggesting the action of a hemolysin, which is one of the products of tetanus, together with indications of spasticity in several cases. Intrathecal administration resulted abruptly in "tetanismus," recorded as being identical with severe and terminal tetanus as produced by tetanospasmin. It is possible that these reactions either are caused by interaction between an amboceptor and an antiamboceptor, accentuating the disease complex, or are an unusual form of the Arthus phenomenon. In any case they may be expected to occur violently in a person who previously has received an antiserum and, after the period required for sensitization, is given a subsequent injection of identical serum in a site for which the original toxin displays an affinity. Reactions apparently cannot be anticipated by tests for serum sensitization or prevented by routine desensitization. Alterations of red cells or hemolysis when a drop of antiserum is added to a coverslip specimen of the patient's blood should give warning of some dangers threatening with intravenous administration. But there seems to be no way of anticipating serious consequences in using the intrathecal route for a patient who has previously received antitetanus serum. It is probable

that the use of heterologous serums will not exclude these reactions. For these reasons, then, when the foregoing conditions are present, I do not feel that the intrathecal administration of antitetanus serum should be advocated at present. Furthermore, antitetanus serum, administered intravenously under similar circumstances, bears serious potentialities which must be carefully guarded against or avoided by using antiserum diluted in physiologic solution of sodium chloride and given by the intramuscular routes, in combination with sedatives, particularly avertin with amylen hydrate, which has found favorable acceptance in the treatment of this disease.

W. E. B. HALL, M.D., Denver.

"REHABILITATION FOLLOWING ACUTE CORONARY ARTERY OCCLUSION"

To the Editor:—Master and Dack, the authors of the article "Rehabilitation Following Acute Coronary Artery Occlusion" (*THE JOURNAL*, Sept. 7, 1940, p. 828), base their claims on their belief that "coronary occlusion is the end result of a progressive arteriosclerotic process, . . ." which process is not related to activity. I take exception to the concept that it is unrelated to activity.

I have never seen a case of acute coronary occlusion in a really sedentary person except as secondary to diabetes or hypertension. The patient may have been retired as to occupation but not as to activity. He may have suffered severe mental anguish or been subjected to physical exertion unrelated to occupation but just as real in the effect on his physical well-being.

The authors stress the losses to insurance companies for claims wherein the patients might have been rehabilitated. Those patients who have returned to work following coronary occlusion will find themselves ineligible for insurance without even as much as legal recourse. Would the authors recommend the so-called rehabilitation cases as "good insurance risks?"

The authors speak of coronary occlusion without regard to the presence or absence of myocardial infarction. An article which disregards the severity of the injury to the heart but speaks of occlusions as if a fixed standard could be applied to them cannot scientifically conclude rehabilitation possibilities. Surely the ten patients who worked through the entire attack did not have infarction and ought not to be classed for such important statistics with the patients who suffered severe infarction.

One might observe from table 6 in the article that of 230 ward patients 123 were workers and laborers, while of 185 private patients only twenty were workers and laborers. This explains why 42 per cent of the private patients resumed full time work as against 23 per cent of the ward patients. There is a definite relationship here indicating an inability to resume occupations taxing the heart.

Furthermore, because the authors themselves admit that those who do not return to work have conditions of great severity, table 10 of the article loses most of its value. Perhaps many of the recurrences might have been avoided in the milder cases if there had not been a resumption of former activities. There can be only one measure of fitness to resume former activity after an attack of coronary occlusion; that measure is the damage to the heart muscle incurred in the individual case. The indication of the condition of the injured heart can be ascertained by the amount of activity the patient can resume without experiencing fatigue. The total evidence lies with the patient himself, since there is no means of measuring the mechanical efficiency of the heart and since even a normal electrocardiogram does not necessarily mean an efficient heart.

HYMAN RAPAPORT, M.D., Los Angeles.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

TROPICALLY ACQUIRED PARASITIC INFECTION AND PREGNANCY

To the Editor:—A married woman aged 25, who returned from Nicaragua after having lived there for two years, engaged me as her physician during her pregnancy. She was five and one-half months pregnant. Her health had previously been quite good and her physical examination was normal except for a severe anemia, hemoglobin being 55 per cent and the red blood count 2,800,000. The differential blood count was normal. After a week the patient suddenly suffered severe epigastric pain, vomiting and diarrhea with a slight amount of blood in the stools. One hour after the onset of pain, the patient went into shock. She required intravenous dextrose and blood transfusion. Twenty-four hours later she was fully recovered. A stool examination revealed both *Ascaris lumbricoides*, *Trichuris trichiura* and the ova of both. Should I pursue a policy of watchful waiting and attempt to eradicate the parasites after the birth of the baby or should I give an anthelmintic at once? If so, what vermifuge could be used with safety at this stage of her pregnancy and in what dosage? M.D., Pennsylvania.

ANSWER.—This case is interesting from several clinical points of view. First of all, residence of a year or more in tropical America on the part of citizens of the United States frequently results in disease, owing in part to exposure to parasitic infections and in part to changes in food and climate. Even if the individual is fortunate in escaping malaria and amebic dysentery, the infective-stage eggs of *Ascaris* and the whipworm (*Trichuris trichiura*) are from time to time ingested in food contaminated by gardeners or servants. Moreover, an enervating climate usually predisposes to less exercise and the diet is almost invariably poor in green vegetables. These environmental conditions and personal habits greatly reduce resistance to disease.

Ascariasis seldom produces a severe anemia and whipworm infection in the United States is rarely heavy enough to alter the blood picture materially. However, a heavy whipworm burden may produce an anemia clinically resembling severe hookworm disease (i. e. with pronounced microcytic hypochromic anemia). The anemia of the patient under consideration is probably caused, at least in part, by a heavy whipworm infection.

Treatment of the patient may consist first of all in combating the anemia by blood transfusions, by feeding iron daily for a period of at least two weeks and by instituting a diet rich in animal proteins and vitamins. *Ascaris* can be safely eliminated by prescribing hexylresorcinol pills. This anthelmintic is administered in a single dose of 1 Gm. (five 0.2 Gm. pills) given in the morning on an empty stomach. Food is withheld for four hours. Two hours after the drug is taken it should be followed by mild saline catharsis to eliminate dead and dying worms and prevent absorption of their toxins into the system. There is no eminently satisfactory preparation available in the United States for removal of whipworms from the bowel, although several courses of treatment with combined carbon tetrachloride and oil of chenopodium (adult dose 2.7 cc. of carbon tetrachloride and 0.3 cc. of oil of chenopodium taken in the morning on an empty stomach after sodium sulfate purgation the night before and followed in two hours with sodium sulfate purgation) will probably remove most of the whipworms. However, this anthelmintic procedure should be reserved, if possible, until after the birth of the baby, since both drugs are relatively toxic and for safety require rather drastic pretreatment and posttreatment saline purgation.

TOXICITY OF NICKEL CARBONYL

To the Editor:—Please furnish me with any information you have on the toxicity of nickel carbonyl at various temperatures. Would a mask serve to protect an individual who handled this chemical?

B. H. Carlton, M.D., Port Sulphur, La.

ANSWER.—Nickel carbonyl, $\text{Ni}(\text{CO})_4$, prepared by passing a current of carbon monoxide over finely divided metallic nickel, is a gaseous liquid with a boiling point of 44 C. Reports of intoxication with nickel carbonyl have been of rare occurrence, although the poisonous properties of this substance present a constant hazard in its study or industrial application, as in the Mond process for obtaining pure nickel. Following inhalation of nickel carbonyl there is transient malaise, with quick recovery in fresh air; but after from twelve to twenty-six hours the

patient becomes dyspneic, cyanotic, febrile and delirious, with a blood stained sputum. Death occurs in from four to eleven days with hemorrhages in the lungs and brain, and pulmonary edema. Nickel carbonyl decomposes to form metallic nickel and carbon monoxide. Although nickel carbonyl is about five times as toxic as carbon monoxide, the nickel is said to be the toxic element because the amount of carbon monoxide liberated from a minimum lethal dose of nickel carbonyl is well below the lethal level for carbon monoxide. From early studies McKendrick and Snodgrass (*Proc. Phil. Soc. Glasgow* 22:204, 1890-1891) concluded that 0.5 per cent of nickel carbonyl vapor was necessary to make the air dangerous. Haldane (*J. Physiol.* 18:430, 1895), however, indicated that as little as 0.05 per cent produces symptoms even during rest. References to variation of the toxicity of this substance with change of temperature do not appear in the literature. As a preventive measure, workers engaged in processes which result in their exposure to fumes bearing nickel carbonyl should be protected by supplied-air respirators. The determination of the quantity of nickel carbonyl present in the atmosphere may be made by aspirating a known volume of filtered air through aqua regia and subsequently determining the amount of nickel salts present in the solution. Recent articles which summarize the symptoms, treatment and prevention of nickel carbonyl poisoning are the following:

Amor, A. J.: The Toxicology of the Carbonyls, *J. Indust. Hyg.* 14: 216 (June) 1932.

Brandes, W. W.: Nickel Carbonyl Poisoning, *THE JOURNAL*, April 14, 1934, p. 1204.

Amor, A. J.: Nickel Carbonyl, *Occupation and Health*, September 1938 supplement.

MYOTONIA CONGENITA

To the Editor:—A white youth aged 17 complains of being "muscle bound." Since early childhood his parents have observed that after he has run a few steps with apparent ease his thigh and leg muscles will all suddenly seem to become tense and the extremities can no longer be moved except with deliberate effort and then at a retarded rate of speed. After a few seconds rest the musculature usually seems to relax and he can run a few steps further with normal facility of motion only to "tighten up" again. As a consequence he has never been able to run as fast as a normal individual. Endurance and strength are excellent as long as he moves at a measured pace. He has become an expert golfer and can swim or walk at slow speeds for long distances. He is unable to play games that require running or sustained rapidity of motion. He was a second child born after an uneventful pregnancy. There was no evidence of birth injury. There are two other children, both normal. There is no similar known neuromuscular dysfunctional state in the family. The boy is blond, robust and sthenic with excellent posture, carriage and a normal walking gait. He is 69 inches (175 cm.) tall, and weighs 145 pounds (66 Kg). To outward appearance his musculature and development are perfectly normal. Complete physical examination is essentially normal. No neurologic abnormalities are found. Cardiovascular studies all are essentially normal. The urine, feces, blood picture and blood Kahn reaction are negative. During test exercises the circumference of the extremity under observation will decrease by three-fourths inch at the time the increased muscle tension of both flexor and extensor groups develops. It is then that both flexors and extensors show more or less tonic contraction and are quite tense. After a few seconds rest the musculature relaxes. I should like advice as to further steps necessary in a diagnostic study. What are the diagnosis, prognosis and treatment if any? M.D., Philippine Islands.

ANSWER.—The history, as given, is entirely consistent with a diagnosis of myotonia congenita, or Thomsen's disease. There are two distinct features of the disease, as emphasized by Thomsen in his original description. As he was a sufferer himself from myotonia, one is entirely justified in using his name with the disease. The first and most constant symptom is the myotonia, or tonic, painless spasm of various voluntary muscles. It may come on after rest, so that a patient finds difficulty in getting out of bed or a chair and walking. After a slow period of warming up, movement may be normal. A second form of the myotonia is the tonic spasm of the muscles after exercise. The muscles are often so set that relaxation is markedly retarded. Patients may become immobilized in a muscle-bound state and fall to the ground *en bloc*. Rarely, however, does the myotonia reach such proportions, and most patients are simply slowed up and prevented from exerting any movement speedily. The thigh muscles are most commonly involved, and inability to run is the most frequent symptom. Endurance and strength are unimpaired; most patients have a fine muscular physique. Symptoms date back to infancy, as this is a congenital disease.

The second primary characteristic of myotonia congenita is the hereditary aspect of the disease. Thomsen described four generations in his own family, and his great-nephew Nissen has carried the record, with thirty-five cases, through three more. Atypical examples, such as the one here described, are rare and Nissen believes that adequate search would always reveal the hereditary strain. Single and sporadic cases, however, have been described and this boy may represent one of them. The

disease has been reported from various parts of the world and in diverse racial stocks.

The physical and neurologic examinations give normal results except for the myotonic reactions. A tap on a muscle is at once followed by a slow, localized contraction, causing a depression in the skin for a number of seconds. Repeated taps require longer and longer periods for relaxation. Electrical stimulation by faradism also gives the prolonged contraction.

Myotonia is present also in dystrophia myotonica, but the stringy atrophic muscles, cataracts and glandular disturbances serve to differentiate this form of dystrophy from myotonia congenita.

The prognosis for life is good; for the disease, grave. In no case is recovery known to have occurred.

Treatment, up to recent times, has been unavailing. Thomsen's recommendation of physical therapy failed to help Nissen, who gave it a thorough trial. In 1936 Wolf found that quinine abolishes the myotonia of myotonia congenita as well as of dystrophia myotonica. The action appears to be exactly opposite to that of prostigmine, a derivative of physostigmine and a pharmacologic antagonist to quinine. Wolf found, moreover, that prostigmine increases the myotonia. The opposite effect of these two drugs, incidentally, is produced in the disease myasthenia gravis, in which there is a condition of lessened muscle tonus, in the clinical sense, and easy fatigue of muscular action. The work of Wolf was confirmed by subsequent studies by Kennedy and Wolf. They recommend a dose of quinine hydrochloride of $2\frac{1}{2}$ to 5, 10 or 15 grains (0.16 to 0.32, 0.64 or 0.96 Gm.) two or three times a day by mouth. Any form of quinine may be used; for example, hydrochloride, sulfate, bisulfate or hydrobromide. Kennedy and Wolf, however, found the hydrochloride the most soluble and quickly absorbed, without disturbing gastrointestinal effects. For effective treatment a constant level of quinine in the blood should be maintained. Cinchonism, as evidenced by tinnitus, calls for a reduction or temporary abandonment of the drug. Doses of 5 grains (0.32 Gm.) three times a day are usually well tolerated and prove to be adequate for an adult to eliminate the symptom of myotonia.

References:

- Thomsen, Julius: Tonische Krämpfe in willkürlich beweglichen Muskeln in Folge von erblicher psychischer Disposition (Ataxia muscularis?), *Arch. f. Psychiat.* 6: 702, 1876.
Nachträgliche Bemerkungen über Myotonia congenita (Strümpell), *Thomsen'sche Krankheit* (Westphal), *ibid.* 24: 918, 1892.
Nissen, Karl: Beiträge zur Kenntnis der Thomsenschen Krankheit (myotonia congenita) mit besonderer Berücksichtigung des hereditären Momentes und seinen Beziehungen zu den Mendelschen Vererbungsregeln, *Ztschr. f. klin. Med.* 97: 58, 1923.
Wolf, Alexander: Quinine: An Effective Form of Treatment for Myotonia, *Arch. Neurol. & Psychiat.* 36: 382 (Aug.) 1936.
Kennedy, Foster, and Wolf, Alexander: Experiments with Quinine and Prostigmine in Treatment of Myotonia and Myasthenia, *ibid.* 37: 68 (Jan.) 1937.
Quinine in Myotonia and Prostigmine in Myasthenia, *THE JOURNAL*, Jan. 15, 1938, p. 198.

ACID ASH DIET AND URINARY CALCULI

To the Editor:—If a patient has had a nephrectomy because of too massive involvement of the kidney by numerous large calcium phosphate calculi, would giving diluted hydrochloric acid, much as we do when babies have strong alkaline urines but in much larger quantities, acidify the urine sufficiently so that a continued acid ash diet will no longer be necessary? Those foods, such as milk, necessary to make my patient regain weight are forbidden because they are urinary alkalisers. Is there any possibility of injuring or altering the function of a normal stomach by the continued use of large doses of diluted hydrochloric acid, say from 30 to 60 minims well diluted per meal? Of course the phosphate and calcium foods will be restricted as much as possible. Giving small doses of insulin daily has brought slow gain because the present diet is so limited in variety.

H. R. Gutmaker, M.D., Philadelphia.

ANSWER.—After one kidney has been removed because of extensive nephrolithiasis, calculi seldom will form subsequently in the remaining kidney. With this margin of safety it is hardly necessary to use such drastic prophylactic measures as might be employed in cases with repeatedly recurring renal calculi. Although it is true that the probability of further stone formation can be reduced by dietary acidification of the urine and by reduction in calcium and phosphatic intake, nevertheless such measures are not always successful. The high acid ash diet is probably the best way of maintaining the acidity of the urine over a long period of time. There may be some difficulty in combining this diet with food ingredients low in calcium and phosphate, but it can be done. There is no reason why the high acid ash diet could not be modified so that it has a caloric intake sufficient to be nutritive. In some cases the high acid ash diet becomes burdensome and urinary acidification may be accomplished just as well by giving the patient enteric coated tablets of ammonium nitrate, 1 Gm. four times a day. Such urinary acidification should be sufficient for prophylaxis if it is

maintained in alternate weeks. Hydrochloric acid is less efficacious in acidifying the urine than is either ammonium nitrate or ammonium chloride. Although alimentary disturbance usually does not result from continuous large doses of hydrochloric acid, it causes gastric irritation in some cases. If the patient is below normal weight there would be no objection to stopping all medication and giving a high nutritive diet over a period of several weeks and then instituting an acidifying dietary regimen or the medication which may seem desirable.

SYPHILITIC CHORIORETINITIS AND PREGNANCY

To the Editor:—A woman aged 25 was diagnosed as having a bilateral chorioretinitis in August 1937. At that time she had a four plus Wassermann reaction and was advised against taking any arsenic preparation because of danger of optic nerve neuritis and atrophy. She was given a bismuth compound each week for fifty-two weeks. She is now apparently three months pregnant and still has a four plus Wassermann reaction. What should be done to prevent congenital syphilis in the unborn child? Would the use of mapharsen be acceptable in a case of this kind?

James B. Maple, M.D., Sullivan, Ind.

ANSWER.—It is not stated whether the patient has congenital or acquired syphilis. This would make a great deal of difference. The present condition of the eyes would also affect treatment. If the patient has acquired syphilis she may be given an intramuscular injection of aqueous solution of sodium bismuth tartrate 2 cc. of the 3 per cent solution twice a week for four weeks and then started on mapharsen intravenously, using 20 mg. the first dose, four days thereafter 30 mg., and if she stands it all right, 40 mg. thereafter once a week for a series of twelve injections. This should be followed with not more than five or six weekly injections of bismuth subsalicylate injections intramuscularly, and finally mapharsen. If the patient has congenital syphilis, one need not worry too much about transfer to the next generation. Third generation syphilis is rare. Nevertheless there would be no harm in giving a few injections of a bismuth compound to be followed by a course of ten arsenical injections and then in turn by a course of bismuth preparations.

BRONCHIAL ASTHMA AND CANAL ZONE

To the Editor:—Is the Canal Zone generally thought to be a good or a poor location for a patient with bronchial asthma? Such a patient contemplates accepting an attractive position there. His condition has been present since childhood. He has learned many of his allergic complexes and responds nicely to desensitization for ragweed. The patient has not been found sensitive to many foods. Sudden changes of temperature are of course a definite problem.

M.D., Illinois.

ANSWER.—The patient may be assured that he will not encounter ragweed pollen in the Canal Zone. While no local studies of atmospheric allergens have been reported for this particular area, all existing reports of similar areas indicate an absence of grasses, weeds and trees of the type found in the United States.

The temperature in the Canal Zone (Ancon) fluctuates little. The Weather Bureau reports the monthly average temperature throughout the year as varying only 1 or 2 degrees from 80 F. The average maximum is 90 F. and the average minimum 72 F. All-time records for maximum temperature are 97 F., for minimum temperature 63 F.

However, if the patient is known to respond adversely to high humidity he will have difficulty in the Canal Zone, where rainfall varies from 70 to 129 inches a year and where the average humidity varies from 77 per cent in January to 87 per cent in June.

ROENTGEN THERAPY AND PITUITARY DAMAGE

To the Editor:—Is there any reason to believe that the usual doses of x-rays commonly used in the treatment of sinus disease in children may provoke any damage to the pituitary gland? Are there any such cases on record?

Frederick H. Von Hofe, M.D., East Orange, N. J.

ANSWER.—As far as can be determined there is no reason to believe that the usual doses of x-rays commonly used in the treatment of sinus disease in children can provoke damage to the pituitary gland.

The dosage used in such cases is not high and the pituitary gland is said to be resistant to x-rays. It is an ordinary observation that in the roentgen treatment of carcinoma of the nasopharynx the dosage is much higher than that used in treating sinus disease. Yet apparent damage is not provoked in the sinusophysis if the customary precautions are employed. It seems almost needless to say that in all roentgen therapy special sense organs such as the eyes and other important ones like the thyroid and pituitary glands should be protected as much as possible.

FILIPINO-WHITE CROSSES

To the Editor:—A white woman who is married to a man whose father is a Filipino and whose mother is of white stock consulted me as to the advisability of having children. She fears the possibility of an offspring with decided Filipino characteristics. Could you send me information regarding this case and would it be possible for you to include information on literature to which I may refer?

M.D., California.

ANSWER.—The offspring is not likely to have any more pronounced Filipino characteristics than does the father—in other words, there will be no tendency to “throw back” to a more remote forebear. The child would probably be somewhat intermediate between the father and the mother unless the father has more pronounced Mongolian characteristics than are usual. There are no adequate studies of Filipino-white crosses, but general discussions of the subject may be found in:

Popenoe, Paul: *The Child's Heredity*, Baltimore, Williams & Wilkins Company, 1929.

Gates, R. Ruggles: *Heredity in Man*, New York, Macmillan Company, 1930.

OXALIC ACID AND GANGRENE

To the Editor:—About one month ago a man complained of severe pain in the tips of three fingers of the right hand and in four of the left. Nothing could be seen or palpated except for a slight grayish discoloration of the skin of the involved digits. The patient's fingers had been in contact with a rug cleaning solution for two hours. The solution consisted of acetic acid, oxalic acid and glycerin. The pain became so severe a few hours following his visit that hospitalization was necessary. The areas mentioned soon became dark and then gangrenous. All the fingertips became infected, which required incision and drainage. The fingers of the left hand healed completely. The thumb and index finger of the right hand remained definitely dry and gangrenous. Surgical intervention was necessary. An exploratory incision revealed that the tissues for about 1 cm. from the gangrenous areas were gray and devitalized. The periosteum of both distal phalanges also was involved. Disarticulation at the first joint was necessary. The blood chemistry, blood Wassermann reaction and urinalysis were negative. I am particularly interested in determining whether the solution used by the patient was responsible for the condition.

M.D., New York.

ANSWER.—This case seems to be similar to that reported by Max Grolnick (Early Gangrene Due to Oxalic Acid Immersion, *New York State J. Med.* 29:1461 [Dec.] 1929), as occurring in a painter who had been scraping floors with a solution containing oxalic acid and who developed gangrene of the hands. Schwartz and Tulipan, in *A Text-Book of Occupational Diseases of the Skin* (Philadelphia, Lea & Febiger, 1939, pp. 109, 241, 543 and 713) and White in the *Dermatogoses, or Occupational Affections of the Skin* (ed. 4, London, H. K. Lewis & Co., 1934, p. 129) both state that oxalic acid is a skin irritant.

Neither oxalic acid nor glycerin has been reported to cause such lesions, but Schwartz and Tulipan (p. 106) report a somewhat similar condition from hydrofluoric acid. In view of these facts there is a strong possibility that the solution used by the patient was responsible for the condition.

LOCAL ANESTHESIA IN INFECTED AREA

To the Editor:—A blister on the anterior surface of the middle phalanx of the index finger resulted in a deep infection. A local anesthetic was injected directly into the sore before incision. Little pus ever drained from the incision but the front of the finger became gangrenous and sloughed away, leaving a bad scar and a stiff finger. Is it good practice to inject a local anesthetic directly into a finger infection for surgery? Is nerve block considered safe in treating finger infections?

M.D., Nebraska.

ANSWER.—It is generally regarded as poor practice to inject a local anesthetic directly into an infected area, particularly a finger, in preparation for a surgical therapy. General anesthesia is preferable. However, there is some weight of authority on the other side of this question. Ludwig Adam (*Surg., Gynec. & Obst.* 60:675 [March] 1935) says “I never have been restrained by inflamed tissues from operating under local anesthesia and I never saw any unfortunate consequence. Of course, if the field is of small size, I prefer circular infiltration in the healthy tissues, or I perform block anesthesia, if feasible; but if it seems necessary, I do not refrain from infiltrating the inflamed tissue. In such cases I use a very fine needle and I inject the solution at a slow rate. I do not enter healthy regions from inflamed ones. In my experience, infiltration of inflamed tissue never caused spreading of the infection; it has rather tended toward quicker amelioration or even subsidence of the inflammation, possibly by abolishing pain.” Wolfsohn (*Chirurg* 4:851 [Nov. 1] 1932) says “The fear most surgeons have of using local anesthesia in the vicinity of furuncles and abscesses does not appear to be well founded.”

A nerve block is less hazardous than infiltration of the inflamed area but is more hazardous than a general anesthesia provided

the latter is given by an expert. It would seem that the safest rule is never to inject local anesthesia into an inflamed area, and to use nerve blocks only when general anesthesia is dangerous or unavailable.

VITAMINS AND ENDOCRINES IN DEAFNESS AND TINNITUS

To the Editor:—I would appreciate an opinion on the value of vitamin E in the treatment of deafness and tinnitus. Dr. Emmanuel Josephson of New York has written newspaper articles on this subject. I have also read of the use of progesterone in the treatment of these conditions. If they have any therapeutic value worth trying I should like an opinion as to dosage, frequency of administration and preparations to use.

M.D., New York.

ANSWER.—There is but little information on the value of vitamin E in the treatment of deafness and tinnitus. A search of the *Quarterly Cumulative Index Medicus* reveals no article germane to the subject.

Tom Spies in *Science* (91:10 [May 31, supp.] 1940) mentions vitamin E as being useful in the treatment of a number of diseases and complaints, among them tinnitus. This should not apply to the ordinary type of case, since Spies was investigating obviously malnourished persons.

There have been some reports on the value of progesterone in the treatment of deafness. Similar claims have been made for other endocrine products, but most of them are not convincing. The claims for any one endocrine product appear to be as enthusiastically supported as any other one; most of the reports pay little attention either to the type of deafness or to the site of the lesion in the auditory apparatus. Lastly, there is a paucity of careful audiometric testing.

In general it may be said that such remedies have as yet no proved value. One must guard against the too eager acceptance of therapeutic claims for the treatment of obscure and stubborn maladies at a time such as this when vitamin and endocrine therapy are undergoing a testing period, and great caution should be exercised in drawing conclusions in the absence of any but the most accurately substantiated results.

FINE VENOCAPILLARY DILATATIONS

To the Editor:—A woman aged 37 has worked as a saleslady for several years, thereby necessitating standing for long hours. She has developed varicose veins in both legs to a mild degree, only two varices being palpable, one in each leg. Her chief complaint, however, is the presence of two moderately large areas of the so-called sky-rocket or spider varices. She desires their removal because of cosmetic reasons. These two areas are proximal to the palpable varices and injection of the latter has had no effect on the former. Is there any method by which these unsightly areas can be removed without considerable possibility of scarring?

Herbert R. Atherton, M.D., University City, Mo.

ANSWER.—Spiderbursts are difficult to treat and cause little trouble. They usually occur in women at the menopause but sometimes earlier and may or may not be associated with varicosities of the saphenous system. Occasionally the fine venocapillary dilatations converge toward a central pool, which may be entered with a fine needle and injected with a mildly irritating solution such as 50 per cent dextrose or 10 per cent sodium chloride. Other patterns, however, which show parallel streaks can only be injected individually with the aid of strong illumination, a powerful binocular loupe and extremely fine needles. The technic has been described by Biegeleisen (*THE JOURNAL*, June 23, 1934, p. 2092). The method is safe in experienced hands but is painstaking and certainly does not prevent the appearance of other spiderbursts. The patients are often dissatisfied.

AGGLUTINATION WITH DYSENTERY BACILLUS

To the Editor:—A married woman aged 29 has lived her entire life in northern Minnesota, with no history of any severe illnesses and no symptoms of dysentery. What is the significance of the report that “agglutination was a typical 1:160 with dysentery bacilli, Flexner type. . . . Agglutination was absent with typhoid, paratyphoid B bacilli, *Brucella melitensis* (abortus) and *Bacterium tularensis* antigens. . . . Dysentery agglutinins may be present without any particular significance?”

I. H. Kiesling, M.D., Nashauk, Minn.

ANSWER.—A patient who has an agglutination which was typical for 1:160 with dysentery bacilli of the Flexner type has had a previous bacillary dysentery infection, and while the agglutinins may be of no particular significance in the case in question it does not mean that the patient may not later have a diarrhea which may be of bacillary dysentery origin.

Reference:

Portis, S. A.: Recurrent Diarrhea Due to Dysentery Organisms, *THE JOURNAL*, June 25, 1932, p. 2132.

Medical Examinations and Licensure

COMING EXAMINATIONS

BOARDS OF MEDICAL EXAMINATIONS BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examinations of boards of medical examiners and boards of examiners in the basic sciences were published in *THE JOURNAL*, October 12, page 1300.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Parts I and II. Various centers, February. Part III. Baltimore and New York during October and Boston during November. Exec. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Written*. Various centers, Feb. 20. Final date for filing application is December 21. *Oral*. Part II. Cleveland, May 31-June 1. Final date for filing application is April 1. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York.

AMERICAN BOARD AND SYMPOLOGY: *Oral*. Chicago, Dec. 6-7. A must be on file not later than Nov. 1. Sec., I. Marlboro St., Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written*. Parts I-A and I-B. Feb. 17. Final date for filing application is Jan. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Part II, Groups A and B. Cleveland, Ohio, June 1941, immediately prior to opening of A. M. A. meeting. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OPHTHALMOLOGY: *Oral*. Cleveland, May or June. *Written*. Various centers, March 8. The only written examination during 1941. Applications must be on file not later than Dec. 1. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Oral and written*. New Orleans, January 1941. Final date for filing application is November 15. Sec., Dr. Fremont A. Chandler, 6 N.

AMERICAN BOARD OF PEDIATRICS: Following the Region I meeting of the American Academy of Pediatrics, Chicago, May 18, following the Region III meeting of the American Academy of Pediatrics. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

Colorado July Report

Dr. Harvey W. Snyder, secretary, Colorado State Board of Medical Examiners, reports the written examination for medical licensure held at Denver, July 3-6, 1940. The examination covered eight subjects and included ninety questions. An average of 75 per cent was required to pass. Sixteen candidates were examined, thirteen of whom passed and three failed. Ten physicians were licensed by endorsement to practice medicine. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Indiana University School of Medicine.....	(1939)	84	
Osteopaths *.....	77, 78, 78, 78.5, 79, 79, 80, 80, 82, 82, 82, 85		
School	FAILED	Year Grad.	Number Failed
Osteopaths *			3
School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
The School of Medicine of the Division of the Biological Sciences.....	(1933) N. B. M. Ex.		
Harvard Medical School.....	(1933) N. B. M. Ex.		
Washington University School of Medicine.....	(1935), (1937), (1938) Missouri		
University of Nebraska College of Medicine.....	(1938)		Nebraska
Ohio State University College of Medicine.....	(1937)		Ohio
University of Oklahoma School of Medicine.....	(1938)		Oklahoma
University of Tennessee College of Medicine.....	(1937)		Tennessee
University of Texas Faculty of Medicine.....	(1939)		Texas

* Examined in medicine and surgery.

Louisiana June Report

Dr. Roy B. Harrison, secretary, Louisiana State Board of Medical Examiners, reports the written examination for medical licensure held at New Orleans, June 6-8, 1940. The examination covered twelve subjects and included 100 questions. An average of 75 per cent was required to pass. One hundred and thirty-three candidates were examined, 132 of whom passed and one failed. Six physicians were licensed by reciprocity to practice medicine. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Rush Medical College.....	(1939)	86.7	
University of Louisville School of Medicine.....	(1939)	89, 91.2	
Louisiana State University School of Medicine.....	(1940)	89.3	
(1940)* 81.6, 82.2, 82.5, 83.3, 83.3, 83.5, 83.9, 84.1, 84.2, 84.4, 84.5, 84.6, 84.9, 85, 85.3, 85.4, 85.4, 85.6, 85.7, 85.8, 85.9, 85.9, 86, 86, 86, 86.2, 86.3, 86.5, 86.5, 86.5, 86.5, 86.7, 86.7, 86.7, 86.7, 86.8, 86.9, 87, 87.1, 87.3, 87.4, 87.5, 87.6, 87.7, 87.8, 87.9, 88, 88.1, 88.2, 88.2, 88.4, 88.4, 88.5, 88.7, 88.8, 89.2, 89.3, 89.4			

Tulane University of Louisiana School of Medicine....	(1940)*	82.2,
82.4, 82.7, 83.3, 83.4, 83.6, 83.9, 84.8, 84.9, 84.9, 85, 85.1, 85.2, 85.2, 85.2, 85.3, 85.4, 85.4, 85.4, 85.5, 85.6, 85.6, 85.7, 85.7, 85.7, 85.8, 85.8, 85.9, 86.1, 86.1, 86.2, 86.2, 86.3, 86.5, 86.6, 86.6, 86.8, 87.1, 87.1, 87.2, 87.4, 87.5, 87.5, 87.5, 87.8, 87.9, 88, 88.1, 88.2, 88.2, 88.3, 88.3, 88.4, 88.6, 88.7, 88.7, 88.7, 88.8, 89.1, 89.1, 89.1, 89.1, 89.3, 89.6, 89.7, 91, 91.2		
Harvard Medical School.....	(1937)	86.9

School	FAILED	Year Grad.	Number Failed
Tulane University of Louisiana School of Medicine....	(1940)		1

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Arkansas School of Medicine.....	(1936, 2)		Arkansas
Emory University School of Medicine.....	(1917)		Georgia
Loyola University School of Medicine.....	(1938)		Illinois
Washington University School of Medicine.....	(1936)		Missouri
Baylor University College of Medicine.....	(1916)		Texas

* Licenses have not been issued.

Book Notices

Annual Review of Biochemistry. James Murray Luck, Editor. James H. C. Smith, Associate Editor. Volume IX. Cloth. Price, \$5. Pp. 744. Stanford University: Annual Reviews, Inc., 1940.

This book, like its companion volumes that have appeared annually since 1932, is indispensable for those who wish to obtain a reading acquaintance with the present status of certain topics in the biochemical field. The present volume contains twenty-six articles by experts in different countries. Much attention is given to the enzymes, which is proper because of the growing knowledge of the importance of enzymes in the mechanism of biochemical processes. There are reviews on biologic oxidations and reductions, proteolytic enzymes and nonproteolytic enzymes. The subjects of other reviews are the biochemistry of carbohydrates and glycosides, the acyclic constituents of natural fats and oils, the lipids, sterols, amino acids and proteins and compounds of sulfur. The subjects of the metabolism of fat, carbohydrate, protein and amino acids are also included. Of special medical interest is a review of clinical applications of biochemistry. Vitamins, hormones, plant pigments, viruses and the organic acids of plants are discussed in separate reviews. There is an excellent article on the biochemistry of malignant tissue. Aspects of inorganic metabolism in plants, soil microbiology, insect biochemistry and the application of radioactive indicators in biology testify to the broad range of subjects which are covered by this volume. An article on the application of microchemistry to biochemical analysis contains brief but critical appraisals of newer methods of chemical laboratory methods. It should be read by every one interested in biochemical research.

It is not possible in a book review to do justice to the material contained in the volume. All that can be done is to list the subjects that are covered and to express appreciation of the services the reviewers have rendered in bringing together the recent literature on their respective subjects. Some of the articles will be out of date, as necessarily any review article must be, to the active investigator in a particular field. Other articles in foreign fields may be so complex that it will not be possible to gain any real knowledge of the subject from studying the review, which, being limited to recent developments, particularly those in 1939 up to November or December as some of the authors have stated, is lacking in the fundamental background of the subject. There still occur a few instances in which a reviewer simply states that a certain subject has been studied and then gives a reference to the original article and no more. This does not help much in forming an opinion about what has been done. A review should provide a critical interpretation of the reports which are cited. The mere fact that a certain subject has been studied can be ascertained by consulting the various abstract or bibliographic journals. Possibly the listing of work that has been done is an attempt to be complete by giving references to all the papers that have been published and still remain within the limits of available space. This is enough material for interesting and informative reading for many days. The book can be highly recommended as an authoritative treatise on recent developments in biochemistry.

Neurology. By S. A. Kinnier Wilson, M.A., M.D., D.Sc. Edited by A. Nislan Bruce, F.R.C.P., D.Sc., M.D., Consulting Physician Bangour Mental Hospital and St. Andrew's Hospital, Stretches. Volumes I and II. Cloth. Price, \$21, per set. Pp. 751, 753-1838, with 347 illustrations. Baltimore: William Wood & Company, 1940.

It is most regrettable that the late Kinnier Wilson's untimely death denied him the opportunity to know and enjoy the enthusiastic worldwide reception which these two remarkable volumes are receiving and justly will continue to receive. The medical world will ever be deeply indebted to Dr. Bruce for having seen to the publication of the manuscript, which at the time of Dr. Wilson's death had not yet reached the hands of the publishers.

This work is a textbook on clinical neurology. It is an excellent and timely successor to the much earlier works of a similar type by Gowers and by Oppenheim. Nor do the present volumes suffer in any respect by comparison with their predecessors. Wilson is concerned here primarily with the description, diagnosis and elucidation of nervous diseases. To this end he has drawn on an unusually full and varied experience, to which he has added probably the most complete survey of the relevant literature to be found in any book or books dealing with neurology. One would err, however, were one to assume that this work is simply a digest of literature. Wilson's patients, observations, ideas, idiosyncrasies and theories constitute the bulk of the material presented. To those of us who knew him these volumes are the essence of Kinnier Wilson. Here to an unusual extent there has been caught by unexciting ink and paper the spirit of a great man. Although it is true that each page is colored by the personal bias of Wilson, few could wish it to be otherwise. There is ample evidence of his love for coining new words and of his affection for the use of foreign words and phrases, which are liberally scattered throughout the text. There is also much typical wilsonian fencing with words, particularly terminology. His intolerance with the unproved and often illogical conclusions of others he does not always find possible to extend to his own dogmatism. Such coloring, however, is the watermark of authenticity, the incontrovertible evidence that these volumes represent the original manuscript.

There are certain sections which merit especial commendation, particularly those on disseminated (multiple) sclerosis, neurosyphilis and the epilepsies. The extensive review of the literature and the full index of authors are most exceptional and useful. It is unfortunate, however, that the bibliographic references assembled in most abbreviated style at the foot of each page are not more readily available. The arrangement of these references in complete form at the end of the last volume would be a most useful though tedious labor for which the neurologic world would be deeply indebted. It would also be advantageous to differentiate in the index of authors between different authors with the same surname. The subject index is incomplete, and not a few subjects discussed in the text are missing from the index. A few others appear to have escaped both.

In places the author has been uncritical as regards therapeutics. In the discussion of the treatment of disseminated sclerosis some twenty odd agents are presented with little or no evaluation of their true worth. There are other less glaring examples of the same fault.

Some subjects which one expects to find discussed in a textbook of this sort are missing. Most notable of these is the lack of any statement as to the symptoms peculiar to the occlusion of the principal arteries of the brain which are commonly so involved, such as the middle cerebral, the anterior cerebral and the postero-inferior cerebellar. Also certain recent advances in neurology escaped inclusion by the author or the editor. Thus hyperinsulinism and its relation to various paroxysmal neurologic disorders, carotid sinus hyperirritability, potassium deficiency in the production of family periodic paralysis and potassium salts in the treatment of that condition, and quinine in the treatment of Thomsen's disease are either not discussed or are dismissed with inadequate consideration.

That Kinnier Wilson for almost his entire life had little or no contact with modern neurologic surgery is responsible for his failure to appreciate in large measure what this special form of therapy has to offer many sufferers from neurologic disease. In this connection it is enlightening to note that when (p. 1148) he wishes to refer the reader to a textbook on neurosurgery

he refers to one English book of 1907, one French book of 1913 and three German books dated 1901, 1930 and 1930.

The presentation of subdural hematoma and of meningeal hemorrhage in general is confusing and not in keeping with modern experience and thought. The presentation of the symptoms of intracranial neoplasm (pp. 1221-1252) leaves something to be desired. The statements relative to the function of the pars intermedia and pars neuralis of the hypophysis (p. 1252) and the relations of these structures to clinical disease (p. 1244, p. 1259, pp. 1262-1264) are unsupportable. The statement on page 1276 that neurosyphilis can cause no difficulty in the differential diagnosis of intracranial tumor because "the spirochaete cannot hide its trail from the laboratory expert" evidences far greater confidence in laboratory techniques than one has come to expect from English clinicians, and one in this instance not quite fully justified. The discussion of spina bifida occulta (pp. 1417-1422) is inadequate and misleading.

Although this book has faults, as what one does not, of which the ones mentioned are representative if not all inclusive examples, they are not sufficient to detract from the true worth of these volumes. No one interested in the nervous system can afford to be without Wilson's Neurology.

Vitamin E: A Symposium Held Under the Auspices of The Food Group (Nutrition Panel) of the Society of Chemical Industry on Saturday, 22nd April, 1939 at the School of Hygiene and Tropical Medicine, Keppel Street, London, W.C.1, England. Cloth. Price, \$2. Pp. 88. New York: Chemical Publishing Co., Inc., 1940.

This monograph is a well presented discussion of vitamin E, its chemistry and physiology and its possible clinical and veterinary uses. The chemistry of vitamin E has been well worked out and synthetic tocopherol now is commercially available. Chemical tests for tocopherol in biologic materials have not yet progressed to the point at which the vitamin can be determined without recourse to animal assays. The physiologic action of vitamin E and the consequences of vitamin E deficiency have been studied by many investigators with conflicting results. Professor Drummond has pointed out that, while the organic chemists have made short work of the problems handed over to them by the biochemists in connection with the elucidation of the composition of the tocopherols, the physiologists at present are confronted with a formidable list of contradictory reports. There is not yet unanimity of opinion on the fundamental question whether the vitamins of the E group are concerned with cellular processes of the animal body or are concerned only with particular organs such as the gonads or the anterior lobe of the pituitary. When it comes to the clinical field, differences of opinion are even more marked. Dr. F. J. Browne summarizes this phase of the discussion by observing that the reports appear to cancel one another out. One author claims that excellent results are obtained in the treatment of habitual abortion with vitamin E, another states that vitamin E is of no use in habitual abortion but is valuable in threatened abortion, and still another author asserts that vitamin E is useful in habitual abortion but of little value in threatened abortion. Dr. Browne concludes that he does not consider a case has yet been proved for the value of vitamin E in either condition. This monograph is valuable because of the stimulating views it provides about the problems remaining for future investigation in the vitamin E field. It is based on a symposium conducted under the auspices of the Society of Chemical Industry in London.

Lehrbuch der Bäder- und Klimahelkunde. Bearbeitet von W. Amelung et al. Herausgegeben von Professor Dr. H. Vogt, Direktor der Reichsanstalt für das deutsche Bäderwesen. Universität Breslau. In zwei Teilen. Paper. Price, 93 marks. Pp. 608; 609-1227, with 397 illustrations. Berlin: Julius Springer, 1940.

This is a two volume textbook on spa therapy and climatology. Volume I deals primarily with spas and volume II with climate and diseases. Volume I begins with a chapter on the geology and natural history of mineral waters and peloids (mud baths). This is followed by the technic of utilizing the baths, including a classification of springs, their examination and protection, and the technical aspects of handling the waters. There is extensive discussion of piping, valves, pumps, faucets and the application of various kinds of baths, such as the tub bath, the bubble bath, the douche, the hot bath and the cold bath. Preparation of moor baths is the subject of a section in chapter II. Another section is concerned with the technic of inhalation of

gases originating from natural waters and the use of such waters internally and as gargles. Chapter III is devoted to the chemistry of waters and peloids with extensive tabular data covering alkaline waters, ground waters, salt waters, calcium waters, Glauber's salt waters, bitter waters, hard waters, iron waters, arsenic waters, sulfide waters, iodine waters, radioactive, carbonated, hot, simple cold, gaseous and sea waters. The chemistry and physics of peloids is included in this chapter. Chapter IV deals with the pharmacology of the waters and peloids, with special reference to their action on the skin, the circulation and, when taken internally, the stomach, liver, kidneys and blood. This chapter follows the same general classification as the preceding one dealing with each class of waters in considerable detail.

Volume II, beginning with chapter V, deals with bioclimatology first on a worldwide basis and then with special respect to Germany. It opens with attention to general characteristics, a discussion of weather and climate on sea level, at moderate altitudes, in the lower mountains and in the high mountains. Climatologic factors, including temperature, wind, atmospheric pressure, moisture, clouds, fog, precipitation and sunlight are described. The physiology of temperature control of the body is described with special reference to energy sources, heat losses, influences of clothing, breathing and work. Descriptions are included of ventilation and electrical and magnetic manifestations in the atmosphere. The effect of climate and weather on the body as a whole and its component parts is discussed with special reference to body weight, musculature, fatty tissue, protein metabolism, acid-alkali balance, the utilization of minerals and carbohydrates and effect on breathing, circulation, general metabolism and the relationship to work and endurance. There is a chapter on "artificial climate."

Chapter VI concerns itself with balneotherapy of the several diseases, beginning with a discussion of the rationale and purpose of the so-called cures. Effects of bath and peloid therapy on various diseases are outlined, including diseases of the blood and circulatory system, rheumatic diseases, children's and women's diseases and endocrine, nervous, digestive, nephritic, blood, skin and so-called catarrhal and allergic diseases. Attention is devoted to surgical and orthopedic indications for balneotherapy. Rather excessive emphasis is placed on climatologic treatment of tuberculosis. Chapter VII is devoted to the organization and general care of patients in baths and spas with reference to general hygiene, nutrition and diet, massage, gymnastics, sport, play and psychologic factors, including music and entertainment. Chapter VIII is descriptive of German baths and spas.

This is a comprehensive, extensively documented, highly detailed discussion of the subject, coming from a land rich in natural spas and therefore greatly interested in their utilization and the study of their effects. It is well printed and extensively illustrated with photomicrographs, diagrams and photographs. Unfortunately it is bound in paper and so poorly sewed that it began to come apart even before the reviewer had finished the first chapter. At this time, when European spas are closed to Americans and a new interest in American resources in this field is becoming manifest, this book should be a valuable reference book for any one interested.

Immunotransfuzii. [By] I. S. Kogan. S predislavim V. N. Shamova. [Immunotransfusions. With preface by V. N. Shamov.] Cloth. Price, 10 rubles. Pp. 328, with 39 illustrations. Kharkov: Izdanie Ukrainskogo Instituta Eksperimentalnoy Meditsiny, 1940.

The work of Wright on therapeutic immunization opened up a new field in the application of blood transfusion. Immunotransfusion, or transfusion of blood from donors previously prepared by vaccination, has had sporadic trials but soon fell into disuse because of more or less disappointing results. The problem was complicated by a multitude of factors involving varying effects of vaccination on the donor, the immunobiologic status of the patient, its modification by the disease and, finally, the effect on it of the transfused blood. The present volume is the result of a six year study carried out by the author in the Ukrainian Institute of Experimental Medicine (direction of Professor Shamov). The effects of active antigens were studied in animal experiments. Determination of immunobiologic indexes of the blood of the recipient was made in the clinical material, comprising 127 patients and 248 transfusions. The

effect of transfusion was evaluated in each instance by the immediate effect on the general condition of the patient and the effect on the composition of the blood, on osmotic resistance of erythrocytes, on sedimentation reaction of erythrocytes, on thrombocytosis, on bone marrow, on immunobiologic indexes of the patient's blood and on reticulohistiocytosis. The author used freshly citrated blood and is at present experimenting with preserved plasma as a substitute. The volume presents a fairly complete and interesting discussion of the various views on the subject, which, together with an extensive bibliographic appendix, makes this valuable contribution the first complete treatise on the subject. The work is in Russian.

The Pineal Organ: The Comparative Anatomy of Median and Lateral Eyes, with Special Reference to the Origin of the Pineal Body; and a Description of the Human Pineal Organ Considered from the Clinical and Surgical Standpoints. By Reginald J. Gladstone, M.D., F.R.C.S., F.R.S.E., and Cecil P. G. Wakeley, D.Sc., F.R.C.S., F.R.S.E., Senior Surgeon, King's College Hospital, London. Cloth. Price, \$10. Pp. 328, with 321 illustrations. Baltimore: William Wood & Company, 1940.

It appears obvious that the greater part of this book, more than the first 400 pages, is the work of Dr. Gladstone, whereas Mr. Wakeley's contribution is to be found in the last fifty pages. The first section, concerned with comparative anatomy and embryology, is based on the hypothesis that the pineal body is the vestige of a median or parietal eye. In passing it should be noted that the proof of this hypothesis is not presented in any clear and concise form. In fact, if it is presented at all it is lost in a tremendous mass of verbiage. The first two hundred odd pages are concerned with a discussion of the lateral and median eyes and their relationships in both invertebrates and vertebrates, a large number of both being presented in great detail. The author then presents the "pineal system" of fishes, amphibians, reptiles, birds and mammals. The anatomic relationships and microscopic appearance of the human pineal body are also presented. This book represents an enormous amount of work in compiling an extensive and variegated amount of information from the literature. It would have been more appropriately entitled "Comparative Anatomy of the Median and Lateral Eyes," and as a compilation of information relative to the photoreceptive organs it may prove of value.

Sir Arthur Keith's pronouncement in the preface, "I should mislead readers were I to assure them that this book . . . reads as easily as a work of fiction" is a classic example of masterful understatement. Reading is not primarily difficult because of some new and unfamiliar terminology but because of complicated and confusing construction. The following two sentences, which form a single paragraph on page 406, are a typical though by no means the most aggravated example:

Both in the past and recently, and in addition to the work done on the nerve supply of the pineal system in fishes, amphibia and reptiles, a large amount of work has been devoted to the study of the sensory cells, nerve cells and tracts of nerve fibers belonging to the pineal system in the human subject and in various types of mammals. This has been carried out largely with the object of demonstrating an anatomical basis by which it may be presumed the pineal organ or epiphysis is capable of being influenced by afferent impulses and can function: either by means of specific hormones secreted by the pineal cells and carried to distant organs in the circulating blood or by means of efferent nerves issuing from the gland and joining the habenular ganglia and other nerve centers of the brain or the intracranial sympathetic system—exerting through these systems a direct influence on other organs, e. g., the secretory cells of the choroid plexuses, or an indirect influence on these cells, by means of vasomotor nerves regulating the circulation of blood in the vessels of the organs supplied by them.

There is also much material of questionable relevance. To select one of many instances: Chapter 25, pages 381 to 391, is entitled "The Human Pineal Organ: Development and Histogenesis." Not one word in this chapter is concerned with the development or histogenesis of the pineal body. Instead the chapter consists of a presentation of the histogenesis of the neural tube, of the development and "functions" of the ependyma, and of the development and morphology of the astrocytes, the oligodendroglia and the microglia.

The clinical sections are weak. Symptomatology is superficially presented. The surgical technic pictured and described does not accord with American methods. Most neurosurgeons will shudder at the prospect of approaching the pineal region by retracting the hemisphere laterally in the parietal region and sacrificing most if not all of the central and parietal veins and at prying the tumor from its bed with a curved dissector.

The author's conclusion that "operations for the removal of pineal tumors have become standardized; and even if the complete removal cannot be undertaken, a postoperative course of deep x-ray therapy will complete the cure, as the majority of pineal tumors are radiosensitive" is not justified by our knowledge of pineal tumors or of x-ray therapy or the author's report of nine cases, all of which ended fatally. In no instance was operation survived longer than nine months.

There is a glossary, an author index and an extensive subject index.

Virus Diseases of Man. By C. E. van Rooyen, M.D., Extra Bacteriologist to the Royal Infirmary of Edinburgh, and A. J. Rhodes, M.B., Ch.B., M.R.C.P.E. With an introduction by T. J. Mackie, Professor of Bacteriology, University of Edinburgh. Cloth. Price, \$18. Pp. 932, with 63 illustrations. New York & London: Oxford University Press, 1940.

This is the most complete monograph on the virus diseases of man that has yet appeared. It includes descriptions of the technic of virus study including microscopy, staining, filtering, centrifugation and culture. Moreover it furnishes an extraordinary monument to the rapid development of knowledge of viruses and reflects the speed with which scientific progress can outstrip formal instruction. The study of viruses and the treatment of the diseases which they cause is developing so rapidly that any book of this nature will require frequent revising for some time to come. Thus even in this new book only a single sentence is devoted to sulfanilamide in trachoma. No textbook, however, can hope to keep pace with all advances and this scarcely seems a valid criticism. The Edinburgh authors have prepared an invaluable reference book for those whose field of professional activity crosses at any point the large group of diseases caused by viruses. It may be highly recommended.

The Work of the United States Public Health Service. Federal Security Agency, United States Public Health Service. Division of Sanitary Reports and Statistics. Supplement No. 152 to the Public Health Reports. Paper. Price, 15 cents. Pp. 82, with illustrations. Washington, D. C.; Supt. of Doc., Government Printing Office, 1940.

This booklet is an outline in condensed and popular style of the material which is to be found in more comprehensive form in the Annual Report to the Security Administrator by the Surgeon General of the United States Public Health Service. It is a descriptive report of the several functions of the United States Public Health Service, including the National Institute of Health, the Division of Foreign and Insular Quarantine, the Division of Domestic Quarantine, the Division of Sanitary Reports and Statistics, the Division of Marine Hospitals and Relief, the Division of Venereal Disease, the Division of Mental Hygiene and the so-called Division of Personnel and Accounts, which is largely an administration division. The report is a condensed descriptive narrative of the work done by the Public Health Service, together with a description of its budgets and the rank, classification and salaries of its personnel. It should be interesting to physicians who may not have a very clear idea of the rather diversified functions of this service, which is the nearest approach in our government to the national health department advocated in the Platform of the American Medical Association. The booklet should also be useful to the program committees and study groups of women's clubs, university students, advanced students in civics and elementary students in public health, to say nothing of the well informed citizen who tries to keep abreast of his government in its expansion.

Khlorny obmen i sekretniya pishchevaritelnykh zhelez. [By] L. S. Lukhtsever. Pod redaktsiyei s predislavleniem M. M. Gubergritsa. [Chlorine Metabolism and Secretion of Digestive Glands.] Cloth. Price, 6 rubles, 50 kopecks. Pp. 182, with 11 illustrations. Kiev: Gosudarstvennoe Meditsinskoe Izdatelstvo USSR, 1939.

This monograph in Russian consists of three parts. In the first part the author presents an interesting discussion and review of the literature on the subject of physiology of chlorine metabolism in the human body. The second part is devoted to a discussion of the present status of our knowledge of the pathology of chlorine metabolism in the human body. Included under this heading are such items as hyperchloremia, hypochloremia and chlorides in infectious diseases, neoplasms, cardiovascular disease and diseases of the kidney. The third part deals with the clinical-experimental work carried on by the author for the past four years and devoted to the clarifying of the subject of the relationship of chlorine metabolism to the

secretory function of the digestive glands. Patients with gastric or duodenal ulcerative disease, nephritic patients and convalescents were subjected to continued drainage of the gastric, duodenal and pancreatic secretions with the aid of a thin stomach tube. The patients were kept on a salt-free diet. The drainage was maintained daily for from five to six hours for from two to four weeks. At six day intervals the potassium, calcium, phosphorus, sodium, chlorine, pancreatic ferments, residual nitrogen, total nitrogen, albumin fractions and alkali reserve were determined. Likewise estimations were made of the urinary chlorides and the chlorides of the gastric and duodenal juice. The author has found that blood chlorides maintained a constant level of concentration even after a fairly long period of deprivation of gastric or duodenal juice. As a rule the chloride concentration of the blood showed a fall in the course of the third or fourth week of drainage only to return to normal after a few days of continued drainage. The fall in blood chlorides was paralleled by its concentration in the cantharides blister fluid, the latter reflecting tissue juices. The author also found dissociation between blood chloride content and the sodium content. Potassium and calcium were uninfluenced. The alkali reserve vacillated within normal limits. Continued drainage of the gastric juices resulted in an increase of the residual nitrogen. Parallelism was not noted between the chloride content of the gastric juices and the gastric acidity. Patients with gastric-duodenal ulcerative disease, as a rule, gained from 3 to 5 Kg. in weight at the end of this regimen and were free from symptoms of hyperacidity and pain. The author sees a therapeutic possibility in connection with the influencing of the biochemical alterations in the state of the electrolytes. Removal of chlorine assists in alkalization of the organism and the creation of optimal conditions for the healing of the ulcer. The author stresses particularly the effect of this treatment on the electrolytes with the resultant stimulation of the vegetative nervous system. The patients remained in a satisfactory condition for from two to three years. Appended is an extensive bibliography. The work, although not entirely convincing, is interesting and provocative.

A Textbook of Pathology. By W. G. MacCallum, Professor of Pathology and Bacteriology, The Johns Hopkins University, Baltimore. Seventh edition. Cloth. Price, \$10. Pp. 1,302, with 697 illustrations. Philadelphia & London: W. B. Saunders Company, 1940.

This book on pathology is remarkable for its clarity of style and its illustrations, which are wonderfully adapted to the text. The illustrations, some of which are in color, are taken almost entirely from material which the author studied in the laboratory. This edition has been thoroughly revised, but the general plan of the book is the same as that of the six previous editions. The general approach to the subject is from the point of view of etiology. Pathology must serve as an accompaniment or even as a foundation for the understanding of clinical phenomena. The importance of detailed study at necropsy is emphasized. All the chapters are followed by references to the literature. The book, which is intended for beginners, has long been a favorite among students and teachers.

Practical Bedside Diagnosis and Treatment. By Henry Joachim, M.D., Chief-of-Medicine, Israel-Zion Hospital, Brooklyn. Cloth. Price, \$7.50. Pp. 828. Springfield, Illinois & Baltimore: Charles C. Thomas, 1940.

To understand this book and appreciate its value, one should first carefully read the preface. The title suggests a regular textbook of medicine, but going into its pages with usual expectations the reviewer was disappointed in their inadequacy and was somewhat dismayed at what has been given space in a well printed and well arranged volume of convenient size. It is mainly a good discourse on differential diagnosis by an able diagnostician who lists the things one must think about before closing the case. To be "practical" as the title demands ("brief" might have been better), diseases are described in contrasting symptomatology, as the author has accumulated his enormous experience. Symptoms are retailed as they "may" occur rather than what did occur in the experience of others. The repetition of this "may be present" is monotonous (twenty-five times or more on a single page) and certainly not so satisfying as a textbook which takes advantage of the experience of others, i. e. recognizes the value of clinical statistics. If the statistical method has influenced the author, he almost never quotes a figure

or a source. The preface states that the book represents the experience of one man, and the author deserves much praise for attempting to pass it on in book form to others. Beginners will not be helped greatly by the book except those whose greatest gift is memory. Mature readers will welcome the book as being better on differential diagnosis than many others but will find the want of references and complete absence of bibliography rather impractical.

A Textbook of Physiology. By William D. Zoethout, Ph.D., Professor of Physiology in the Chicago College of Dental Surgery (Loyola University), and W. W. Tuttle, Ph.D., Professor of Physiology, College of Medicine, State University of Iowa, Iowa City. Seventh edition. Cloth. Price, \$4.50. Pp. 743, with 302 illustrations. St. Louis: C. V. Mosby Company, 1940.

This edition appears two years after the preceding and occupies twenty-nine more pages, a part of which increase is due to printing in larger type the material formerly put in 8 point type. There are eleven more illustrations than in the earlier edition. The number of tables remains unchanged at thirty-six. Most of the textual matter is unchanged, but with the addition of a second author a few new paragraphs have been added and others rewritten; however, in the main, the book is not radically altered. It is still a useful textbook for elementary and intermediate students of physiology. The style is in general direct and simple. At some points a considerable biochemical background is presupposed in the reader, and elsewhere no knowledge whatever. The printing is excellent and typographic errors are few.

Sex in Marriage. By Ernest R. Groves and Gladys Hoagland Groves. Second edition. Cloth. Price, \$2. Pp. 250. New York: Emerson Books, Inc., 1940.

This book by Professor and Mrs. Groves is more or less in the nature of an extension of their series of books on family relationships, of which *Wholesome Marriage* and *Wholesome Parenthood* are previous volumes. This book deals with sex problems in marriage, taking up first the relationship of sex and happiness in marriage. This is followed by a discussion of the effect of one's background and premarital experience on one's attitude toward sex in marriage. In mentioning premarital experience the authors intend a broad reference to sex knowledge, observation and attitude rather than to actual sexual intercourse before marriage, although this naturally is included. The sex equipment, with special emphasis on the broader biologic and psychologic aspects, is described. Chapters are devoted to the beginnings of marriage, the "love art" of the husband and wife and some common sex problems of marriage. Throughout, the approach is broadly biologic and psychologic rather than narrowly anatomic and physiologic. There is no description of the sex organs and no detailed advice about so-called sex technic. A calm and objective chapter on birth control and a philosophical discussion of sex and life conclude the book. This book can be recommended by physicians to their patients with confidence. A healthy, intelligent adult, possibly suffering from sex inhibitions and maladjustments carried over from childhood, will find it sanely and constructively helpful. It is one of the better contributions to the growing and voluminous modern sex literature for lay readers.

Gross Anatomy: A Brief Systematic Presentation of the Macroscopic Structure of the Human Body. By A. Brazier Howell, Associate Professor of Anatomy, Johns Hopkins University School of Medicine, Baltimore. Cloth. Price, \$6. Pp. 403, with 56 illustrations. New York & London: D. Appleton-Century Company Incorporated, 1939.

It is interesting that a concise, time saving compendium of gross anatomy appeared from Johns Hopkins Medical School when that institution more than any other has been responsible for the progressive curtailment of time allotted to the study of gross anatomy. The language is terse and descriptive and the sentences are short and readable. Incorrect anatomic descriptions which have been carried in textbooks throughout the years have been replaced in this book by the proper descriptions. The volume is well planned, well printed and well organized. It also is clearly indexed. The schematic type of line drawing has been used throughout to good advantage. Far too few drawings, however, intersperse the text. The book is an excellent small reference work. It has a good embryologic foundation. The English equivalents of the Basle anatomical nomenclature are used throughout.

Miscellany

NORMAL LIFE AFTER REMOVAL OF RECTUM

Condensation of a paper written by a layman who has developed a technic for caring for a colostomy which enables him to carry on an active life cheerfully. This grateful patient hopes that the routine which he has developed after periods of trial and error will encourage and inspire fellow sufferers to a bright outlook on life.—ED.

A year ago I consulted a surgeon for what I believed was a slight rectal ailment. He told me that I had cancer of the rectum and that I would have to undergo an operation involving removal of the rectum and terminating of the bowel tract in a colostomy. After he explained that this would mean that, even if the operation was entirely successful, I would have no control over excretion of fecal matter, I cared little whether I survived the operation or not. Today after this ordeal I enjoy better health than ever before, and friends tell me that I have never looked so well. I am a lawyer engaged in active practice and I work hard. I eat, drink, smoke, dance, punch the bag, and I have even ridden a surf board at Waikiki Beach.

The ability to lead a normal life is due to the development by trial and error of a technic which is all but automatic. The following equipment is essential:

1. Sponge rubber kneeling pad.
2. Towel over kneeling pad.
3. Woolen sport shirt.
4. Enema bag.
5. Glass connecting tube.
6. No. 24 catheter.
7. Largest size safety pin.
8. Small bathroom stool.
9. Rubbing alcohol.
10. Small kidney basin.
11. Two Perry colostomy belts.
12. Man's wide band elastic athletic supporter.
13. Gauze pads.
14. Yellow petrolatum.
15. Small piece of oiled silk.
16. Cellucotton.

My colostomy is about three inches below the navel. I do a complete irrigation every morning immediately after breakfast. By kneeling in front of an ordinary toilet, the opening is only a few inches above the toilet, and, in that position, flushing the bowel is no inconvenience. I suggest that irrigating from the kneeling position be started as soon as possible after the operation. I kneel on a sponge rubber pad, such as is regularly used by scrub-women. It is necessary to place a towel over the pad, as otherwise the rubber will make the bare knees sore.

During the irrigation I wear a woolen top sweat shirt, such as is worn by baseball players. I cut off the bottom of the shirt front but did not cut off any part of the back.

I use an ordinary No. 24 soft rubber catheter in which, with a penknife, I made a second small hole opposite the other hole. The tip is greased with petrolatum and should be inserted about four inches; if resistance is met after the tip of the catheter is barely inserted, the pressure of the water will force sufficient distention of the bowel to enable the catheter to be inserted farther. The other end of the catheter is attached to a glass connecting tube, which in turn is attached to the tube of an enema bag, which I hang on a nail in the bathroom wall about shoulder high. Best results are obtained by filling the bag three times with warm to hot water.

Rubbing alcohol and a small size kidney basin are indispensable, because for some fifteen or twenty minutes after completing the irrigation there is the probability of further excretion. If it is necessary to walk across the room for some forgotten object, the kidney basin can be held against the abdomen. After the enema bag is emptied, I massage the abdomen because massage stimulates discharge. On finishing, I fold four or five sheets of toilet paper, sprinkle them with rubbing alcohol, and use them to clean the abdomen; the alcohol seems in some way to stimulate further discharge. Frequently, about twenty minutes after bowel activity has apparently ceased there is a second dis-

charge. As it was annoying to wait for the possible second discharge, I arranged a mirror over the toilet so that I can shave while waiting.

The entire operation consumes less than an hour. When finished, I put on my Perry colostomy belt, after lining the cap with two types of toilet paper—one fairly hard type of paper for rigidity in holding the cap in shape, and one soft type of paper for absorption of any slight mucous discharge. I have two belts, so that they can be washed at convenient intervals.

Perhaps only once in three months is there any discharge at all after the irrigation, and these occasional instances occur immediately after eating some food which stimulates intestinal activity. All my life there were a few foods, such as stewed apples and stewed prunes, that caused pronounced bowel activity. I avoid eating these few foods; otherwise my diet is unrestricted.

At first the colostomy belt was an instrument of torture. Now it is entirely free from discomfort; I am no more aware of it than the average man is aware of the belt on his trousers. I soon found, however, that this type of belt was not comfortable for sleeping or for exercising. Now when I exercise or go to bed I wear an ordinary wide elastic athletic supporter, with the pocket cut off; under the band (and over the colostomy) I place a piece of gauze one foot square crumpled to the size of a silver dollar after greasing the gauze with yellow petrolatum. Over the fluff I put about a dozen sheets of toilet paper, and over that I put oiled silk to prevent grease from soiling the supporter.

All of this equipment can be put in a small suitcase for traveling. I have made extensive trips by boat, train and plane.

A person reading my description might conclude that this is an ordeal. On the contrary, there is not the slightest trace of pain and it is no more trouble than a daily shave, except for the time consumed.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Medical Practice Acts: Unlicensed Practice Enjoined as a Public Nuisance.—The state of New Mexico, on the relation of the appropriate district attorney, sought to enjoin the defendant, Compere, from practicing medicine without a license. The complaint alleged, in effect, that the unlicensed practice of medicine by the defendant was a public nuisance, detrimental to the public welfare and dangerous to the public health, since the defendant was so unskilful and uninformed in the practice of medicine and without moral character that his treatments endangered the lives, health and welfare of his patients and of the public in general. The trial court sustained a demurrer to the complaint and the state appealed to the Supreme Court of New Mexico.

The sustaining of the demurrer, the defendant contended, was proper in view of *State v. Johnson*, 26 N. M. 20, 188 P. 1109, 1110. In that case the state sought to enjoin Johnson from practicing osteopathy and medicine without a license, but all that was alleged in the complaint seeking that relief was that Johnson's unlicensed practice "constitutes a nuisance, and is dangerous, detrimental, and injurious to the health of the inhabitants of the county of Bernalillo and state of New Mexico." In that case the Supreme Court of New Mexico, in holding that the complaint failed to state a cause of action, said:

Our Code provides that complaints must contain "a statement of the facts constituting the cause of action, in ordinary and concise language." . . . Examining the complaint, we find but one fact stated, viz. the practice of osteopathy or medicine without a license. The allegations that such practice is a nuisance, or is detrimental, dangerous, and injurious to the public health, are merely conclusions of the pleader. Practicing osteopathy or medicine without a license is not a nuisance per se.

But, said the Supreme Court, our decision in the Johnson case is not here decisive. If the state had here alleged no more than the practice of medicine without a license and had merely pleaded the conclusion that this was dangerous and a nuisance, we believe a demurrer should be sustained. But here the state alleges much more. The complaint in this case, it is true, does allege

that the defendant is unlicensed, but it also sets forth that he "is unskilful and uninformed in the practice of medicine, and does not possess the moral and professional qualifications required" for such practice; that, because he is uninformed on the subject of medicine and because of his lack of skill and his want of moral and professional qualifications, in prescribing drugs and treating physical and mental ailments of the people he endangers the health and lives of the public. The demurrer admits the truth of these allegations. These are sufficient allegations of ultimate facts, absent in the Johnson case, "to let the complaint by the demurrer," unless in other respects the complaint in this case is bad.

Briefly summarized, the defendant contended that the present complaint is fatally defective because (a) the penal provisions of the New Mexico medical practice act afford an adequate remedy against one who practices without a license; (b) an injunction would violate his constitutional guarantee of a jury trial, and (c), even though he does all the things alleged in the complaint, such conduct on his part does not constitute a public nuisance. The court did not regard the penalty authorized by the medical practice act for unlicensed practice (a fine of not more than \$100 and/or imprisonment not to exceed ninety days) a remedy exclusive or adequate for such an offense. While power to abate a public nuisance, said the court, is "an ancient head of equity jurisdiction," there was a time when courts of equity refused to enjoin an act of criminal nature or an offense against the public, even if the act was a public nuisance, provided the act complained of did not interfere with the enjoyment of property. At this time, however, it is well established that injunctive relief may be utilized to protect the public health, morals, safety and welfare from irreparable injury by a public nuisance, and the fact that the acts constituting the nuisance are punishable criminally will not deprive equity of its power to enjoin in a proper case. Equity acts in such cases not because the acts are criminal but rather in spite of that fact. In so holding the court cited with approval *People ex rel. Bennett v. Laman*, 277 N. Y. 368, 14 N. E. (2d) 439; *Kentucky State Board of Dental Examiners v. Payne*, 213 Ky. 382, 281 S. W. 188, and *State ex rel. La Prade v. Smith*, 43 Ariz. 131, 29 P. (2d) 718, in all of which the courts enjoined as a public nuisance the unlicensed practice of a profession. Admittedly, continued the court, there are decisions to the contrary, but we prefer to follow the decisions holding equitable relief proper if facts similar to those here alleged are proved. This is not to say that in a trial on the facts the mere showing of illegal practice warrants injunction. Nevertheless, if unlicensed practice is carried on from day to day among the people generally by an unskilled and ignorant pretender who prescribes drugs, dangerous as well as harmless, and directs treatment for all manner of ills, physical or mental, to which the flesh is heir, it requires little imagination to conclude that the health and lives of the people so served and of the whole community are jeopardized. Such practice clearly falls under the definition of a public nuisance. In *Stamm v. City of Albuquerque*, 10 N. M. 491, 62 P. 973, it was taken for granted by the territorial court that anything menacing the health of the public generally was a public nuisance. Where the facts are alleged as strongly as in the instant case, it is better, we think, that the trial court hear the evidence and on it grant or deny relief than to declare as a matter of law that such conduct does not amount to a public nuisance, which we believe it does.

In the opinion of the court, the awarding of injunctive relief worked no deprivation of the defendant's constitutional guarantee of a jury trial, since the state constitutional provision concerned (Article 2, Sec. 12) merely provides that the right of trial by jury as it existed at the time of the adoption of the constitution shall be secured to all and remain inviolate, and since, because equity anciently had jurisdiction to abate a public nuisance, the defendant was not entitled to a jury in such a case as this at the time of the adoption of the constitution.

The defendant further contended that because a provision of the dental practice act requires a person to be convicted one or more times of practicing dentistry without a license before he can be enjoined from practicing without a license, the legislature evidenced a policy to deny the injunctive process against the unlawful practice of medicine. This is transparent reasoning,

answered the Supreme Court. If it is true, as we hold, that the power to abate a public nuisance is "an ancient head of equity jurisdiction," and that any practice or condition that menaces the lives, health and welfare of a considerable number of the people in a given community constitutes a public nuisance, as is now generally agreed, then it would be more correct to say that the legislature, in failing to interpose the same condition to injunctive relief against the illegal practice of medicine as it did with reference to the illegal practice of dentistry, has evinced an unmistakable purpose to leave equity courts unfettered in their power to abate as a public nuisance what is unquestionably the more dangerous practice.

The Supreme Court concluded that the trial court erred in not permitting the state to present evidence in support of the facts alleged in the complaint, which, if established, undoubtedly would present a case of a public nuisance and would authorize the issuance of an injunction. The judgment of the trial court was therefore reversed and the trial court directed to overrule the defendant's demurrer.—*State ex rel. Marron, Dist. Atty. v. Comperc (N. M.)*, 103 P. (2d) 273.

Medical Practice Act (Michigan): License Not Required to Practice Midwifery.—The medical practice act of Michigan was amended in 1913 and, after providing for the examination, regulation, licensing and registration of physicians and surgeons, provided that those "who wish to begin the practice of medicine, surgery and midwifery in any of its branches, in this state, shall make application to the board of registration in medicine, to be registered and for a certificate of registration." The defendant, a midwife qualified by education, training and practical experience and engaged solely in the practice of midwifery, had never applied for or obtained a certificate of registration. She was convicted of practicing medicine without a license in violation of the medical practice act, as amended. From that conviction she appealed to the Supreme Court of Michigan.

The amended medical practice act did not provide a penalty for the practice of midwifery apart from the practice of medicine or surgery. The defendant contended that the amended act, therefore, did not apply to a person engaged solely in the practice of midwifery, but applied only to those who wished to practice medicine, surgery and midwifery, inclusive. According to an opinion of the attorney general of Michigan, rendered in 1914, the practice of midwifery had long been recognized as separate and distinct from the practice of medicine and surgery. At that time the attorney general expressed the further opinion that, since the 1913 amendment to the medical practice act did not specifically provide for the registration of those desiring to practice midwifery only or refer to the statutes recognizing that practice, the amendment could be construed only as regulating those practicing medicine, surgery and midwifery. The Supreme Court adopted the attorney general's opinion and held that "the invoked statute does not include the practice of midwifery only," and so the defendant was not required to take the examination required of physicians and surgeons and obtain a license. The court pointed out, however, that persons who desire to practice medicine and surgery and midwifery, as components of their practice, must pass such an examination and be licensed. The judgment of conviction was therefore reversed.—*People v. Hildy (Mich.)*, 286 N. W. 819.

Malpractice: Liability of Attending Physician for Burns Sustained in Maternity Home.—The plaintiff's wife was delivered of a baby by the defendant physician at a maternity home owned by Mrs. Scoby. The baby was given to Mrs. Scoby, who was instructed by the defendant to keep it warm. She wrapped it in a rayon blanket, placed it on an overstuffed chair in the reception room on top of an electric heating pad which was connected by an electric cord to a light fixture hanging from the ceiling. About half an hour later, after attending to the mother in the delivery room, the defendant thoroughly examined the baby in the reception room and found it to be normal, but he did not see the heating pad or the cord attached to it. He then left the maternity home and returned when summoned about two hours later, at which time he found on the baby's buttocks two burns, one the size of a silver dollar

and the other the size of a half dollar. As a result of these burns it was claimed that nephritis developed, which necessitated expenditures by the plaintiff of about \$3,500 for medical and hospital services. The plaintiff later sued the defendant physician for malpractice. From the judgment of the trial court directing a verdict for the physician, the plaintiff appealed to the Supreme Court of Michigan.

Although, said the Supreme Court, the testimony of the plaintiff's witnesses was to the effect that at intervals it had been observed that the heating pad had been connected for a period of about one hour, none of these witnesses were present at the time the defendant examined the baby. It was quite possible that between such intervals Mrs. Scoby may have disconnected the electric cord prior to the physician's examination and reconnected it afterward. The defendant testified that he did not advise the use of the pad, knew nothing about it until after the burn, did not see it at the time he made his examination of the baby, and if the appliance had been connected at that time he would have noticed it and had it removed. The court considered it significant that the plaintiff had failed to call as a witness Mrs. Scoby, who was present at the time of the physician's examination, to testify whether or not at that time the heating pad was connected. In the judgment of the court, the evidence did not show that the heating pad was present under the baby and connected at the time of the defendant's examination. The majority of the court was of the further opinion that the plaintiff had also failed to prove that the defendant had been negligent in failing to observe that a heating pad was being used to keep the baby warm.

The testimony, continued the court, showed that the use of the heating pad was solely Mrs. Scoby's idea. The defendant did not instruct her to place the baby on such a pad. His only instruction was to keep the baby warm. The heating pad was placed by her under the child while the defendant was in another room attending the mother. The court concluded, therefore, that the defendant was not liable for the negligent acts performed out of his presence and without his knowledge by Mrs. Scoby, who was employed by the plaintiff and not by the defendant.

Accordingly, the Supreme Court affirmed the judgment in favor of the defendant.—*Wabeke v. Bull (Mich.)*, 286 N. W. 825.

Society Proceedings

COMING MEETINGS

- American Academy of Pediatrics, Memphis, Tenn., Nov. 18-20. Dr. Clifford G. Grulec, 636 Church Street, Evanston, Ill., Secretary.
- American Clinical and Climatological Association, White Sulphur Springs, W. Va., Oct. 28-30. Dr. Francis M. Rackemann, 263 Beacon St., Boston, Secretary.
- American College of Surgeons, Chicago, Oct. 21-25. Dr. Frederic A. Besley, 40 East Erie St., Chicago, Secretary.
- American Society of Anesthetists, New York, Dec. 12. Dr. Paul M. Wood, 745 Fifth Ave., New York, Secretary.
- American Society of Tropical Medicine, Louisville, Ky., Nov. 12-15. Dr. E. Harold Hinman, Malaria Control Division, Wilson Dam, Ala., Secretary.
- Association of American Medical Colleges, Ann Arbor, Mich., Oct. 28-30. Dr. Fred C. Zapffe, 5 South Wabash Ave., Chicago, Secretary.
- Central Neuropsychiatric Association, Milwaukee, Oct. 25-26. Dr. William C. Menninger, 3617 West Sixth Ave., Topeka, Kan., Secretary.
- Central Society for Clinical Research, Chicago, Nov. 1-2. Dr. Carl V. Moore, Washington University School of Medicine, St. Louis, Secretary.
- Indiana State Medical Association, French Lick, Oct. 29-31. Mr. Thomas A. Hendricks, 23 East Ohio St., Indianapolis, Executive Secretary.
- New York State Association of Public Health Laboratories, Albany, Nov. 1. Miss Mary B. Kirkbride, New Scotland Avenue, Albany, Secretary.
- Omaha Mid-West Clinical Society, Omaha, Oct. 28-Nov. 1. Dr. J. D. McCarthy, 107 South 17th St., Omaha, Secretary.
- Pacific Coast Society of Obstetrics and Gynecology, San Francisco, Nov. 6-9. Dr. T. Floyd Bell, 400 Twenty-Ninth St., Oakland, Calif., Secretary.
- Puerto Rico Medical Association of San Juan, Dec. 13-15. Dr. David E. Garcia, P. O. Box 3866, Santurce, Secretary.
- Radiological Society of North America, Cleveland, Dec. 2-6. Dr. Donald S. Childs, 607 Medical Arts Bldg., Syracuse, N. Y., Secretary.
- Southern Medical Association, Louisville, Ky., Nov. 12-15. Mr. C. P. Loran, Empire Bldg., Birmingham, Ala., Secretary.
- Southern Surgical Association, Hot Springs, Va., Dec. 10-12. Dr. E. Alton Ochsner, 1430 Tulane Ave., New Orleans, Secretary.
- Southwestern Medical Association, Tucson, Ariz., Nov. 21-23. Dr. M. P. Spearman, 1001 First National Bank Bldg., El Paso, Texas, Secretary.
- Western Surgical Association, Topeka, Kan., Dec. 6-7. Dr. Albert H. Montgomery, 122 South Michigan Blvd., Chicago, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

Alabama State Medical Assn. Journal, Montgomery

10:41-76 (Aug.) 1940

- Management of Placenta Praevia. M. S. Lewis, Nashville, Tenn.—p. 41.
The Changing Picture of Disease in the Southern States. J. S. McEster, Birmingham.—p. 47.
*Lead Poisoning in Infancy. J. W. Bruce, Louisville, Ky.—p. 50.
Planigraph: Simple Method for Making True Radiographic Images of Selected Planes. L. L. Hill Jr., Montgomery.—p. 52.
Intra-Abdominal Adhesions: Some Problems in Diagnosis and Treatment. J. L. Carmichael, Birmingham.—p. 56.

Lead Poisoning in Infancy.—Bruce states that his experience at the two charity hospitals of Louisville leads him to believe that lead poisoning is not an uncommon cause of convulsions in children. Lead may be the direct as well as the indirect cause of convulsions, as a child who has suffered from lead encephalopathy will be more susceptible to convulsions when acute infections are contracted later on. Lead poisoning is possible by inhalation or ingestion. Battery boxes are a tempting source of fuel to the poor, but the smoke carries particles of lead which are easily inhaled in the poorly ventilated and over crowded dwellings. However, the commonest cause is chewing paint from furniture, toys and window sills. Drinking water may be contaminated with lead from white lead used in plumbing. Other causes may be lead nipple shields and lead-containing ointments on the breast of nursing mothers. Irritability is one of the principal clinical symptoms of lead poisoning in young children. The most constant finding is the x-ray appearance of a dense white line in the epiphyses of the long bones. Every child less than 5 years of age with convulsions, unless from an obvious cause, should have roentgenograms of these bones made. Treatment consists of removing the source of lead, except in the case of encephalopathy when sedatives are indicated, and the child permitted to delead himself slowly. This is safer than any method of deleading, which may bring the lead from the bones, where it is harmless, into the blood stream and into the nervous tissues when convulsions occur.

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- Influence of Carbon Dioxide on Excitability of Vasomotor Center in Hypoglycemia. E. Gellhorn, W. F. Kiely and S. L. Hamilton, Chicago.—p. 256.
Studies on Hypoglycemic and Anoxic Convulsions. E. Gellhorn, A. Packer and J. Feldman, Chicago.—p. 261.
Chemical Composition of Uterine Secretions. H. E. Shih, Janet Kennedy and C. Huggins, Chicago.—p. 287.
Effects of Magnesium on Nervous System in Relation to Its Concentration in Serum. H. E. Hoff, P. K. Smith and A. W. Winkler, New Haven, Conn.—p. 292.
Comparative Parenteral and Oral Assays of Adrenal Cortical Hormone Substances. M. H. Kuizenga, J. W. Nelson and G. F. Cartland, Kalamazoo, Mich.—p. 298.
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Balance of Physical Forces Which Determine Rate and Direction of Flow of Fluid Through Intestinal Mucosa. H. S. Wells, Nashville, Tenn.—p. 410.

Annals of Internal Medicine, Lancaster, Pa.

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- New and Economical Desiccating Process Particularly Suitable for Preparation of Concentrated Plasma or Serum for Intravenous Use: Adevac Process. J. M. Hill and D. C. Pfeiffer, Dallas, Texas.—p. 201.
*Rust and Smut, Major Causes of Respiratory Allergy. G. L. Waldbott and M. S. Ascher, Detroit.—p. 215.
Von Recklinghausen's Neurofibromatosis with Bone Manifestations. E. Uhlmann and A. Grossman, Chicago.—p. 225.
Studies in Pernicious Anemia: Inquiry into Role of Pepsin. S. Morrison, Baltimore.—p. 242.
*Pathogenesis of Banti's Disease. W. P. Thompson, New York.—p. 255.
Clinical Observations on Blood Iron. B. S. Walker and R. Fitz, Boston.—p. 263.
Spleen Size in Pernicious Anemia. E. Bigg, Chicago.—p. 277.
Capillary Resistance in Artificially Induced Fever. P. L. Rossman, Cleveland.—p. 281.
*Treatment of Hypertension; Medical versus Surgical. E. V. Allen and A. W. Adson, Rochester, Minn.—p. 288.
Activities of the American College of Physicians in Graduate Medical Education. H. J. Morgan, Nashville, Tenn.—p. 308.

Rust and Smut Causing Respiratory Allergy.—Waldbott and Ascher found that certain patients with severe symptoms of asthma during July and early August were sensitive to the spores of rust and smut. Among 106 consecutive patients with asthma and nasal allergy there were seven asthmatic patients who exhibited symptoms at no other time than late July and early August, ten suffered more or less severe exacerbations of a perennial asthma during this time and two suffered similar exacerbations of nasal catarrh. The other eighty-seven patients had no symptoms at the time in question. Throughout the summer months of 1938 the patients were instructed to keep a record of the dates of their symptoms. In their daily symptom chart the severity was graded from one to four plus. Scratch and intradermal skin tests were performed for the rusts of wheat and the smuts of corn and oats. As control tests extracts from the grains, as well as of the straws of the selected rusts and smuts (wheat, oats and corn) were applied. Also the 106 patients were tested for alternaria, hormodendrum, penicillium, timothy and ragweed, as these pollen and fungi were constantly present in the air during the season in question. The straws used for extraction were examined microscopically and found free of rust and smut infection. The seven patients with symptoms only in July and early August exhibited by far the strongest reactions to the rust and smuts, whereas their reactions to pollen and the other fungi were considerably less pronounced. The twelve patients suffering exacerbations at the rust and smut season reacted less to rust and smut but gave stronger reactions to the pollens and the other fungi. The control group of eighty-seven patients gave negligible reactions to rust and smut, but those to pollens were most pronounced. The patients sensitive to smut and rust were also more sensitive to the respective cereals and their straws than were the other patients. In no case were individual reactions to the grain as strong as to the fungus. All the patients gave only minor skin reactions to the other fungi tested. Two patients were encountered in whom intradermal skin tests for rusts produced generalized reactions, even though preliminary scratch tests were carried out. Effects of hyposensitization with rust and smut extracts were very striking in some of the patients; the symptoms subsiding after two or three injections. The treatment is difficult to evaluate, as the fungus season is relatively short and spontaneous recovery may have occurred in some of the patients. The serum of the two patients with strongly positive intradermal responses to rust produced positive passive transfer reactions on normal individuals. Two cases are reported in which asthmatic symptoms were reproduced on inhalation of rust powder outside the season.

Pathogenesis of Banti's Disease.—According to Thompson, during the last ten years 137 cases of Banti's disease were seen by members of the spleen clinic at the Presbyterian Hospital. Of the 137 cases 100 have been followed for a sufficient number of years for ideal clinical investigation. The current concept of the spleen clinic is that Banti's syndrome is the result of mechanical obstruction to the flow of blood within the portal system. The site and character of the obstruction must be such that a chronic increase in splenic vein pressure occurs. At the same time the venous pressure in the peripheral circuit should be approximately normal. This differential in

pressure is, they believe, the actual cause of the splenomegaly and explains the collateral circulation. Microscopic study of sections of sixty-eight spleens from patients with congestive splenomegaly has led to the conclusion that no detectable histologic differences exist between the spleens of the various subdivisions of this syndrome. All show variable degrees of follicular atrophy, fibrosis of the pulp with dilated venous sinuses and perifollicular hemorrhages. The obstructive lesions are intrahepatic or extrahepatic. The intrahepatic lesion is cirrhosis. Hepatic cirrhosis was present as the obstructive factor in 68 per cent. The typical clinical and pathologic picture of Banti's disease develops secondary to portal hypertension. This sequence is responsible for the splenic enlargement seen in Egypt, China and the Caribbean area and due to schistosomiasis mansoni. Biliary cirrhosis and cardiac cirrhosis do not produce congestive splenomegaly. Periportal cirrhosis of the Laënnec type results in a variable degree of splenomegaly. A review of eighty-one necropsies reveals that approximately 60 per cent recorded as Laënnec cirrhosis have an associated splenomegaly of the Banti type and esophageal varices. The periportal scars are dense and there is great distortion of the intrahepatic vascular bed and minimal evidence of hepatic cell damage. Many of these patients present the clinical features of Banti's disease and many ultimately die of hemorrhage from rupture of the esophageal varices. In the remaining 40 per cent there is less connective tissue, less distortion of the vascular bed and more evidence of injury of the hepatic parenchyma and these individuals die of hepatic insufficiency with clinical cholemia. Intermediate stages exist. The degree of splenomegaly can be predicted from microscopic study of the liver. The important lesion is in the liver, and the extent, type and velocity of progress of the hepatic lesion is what determines the prognosis. If cirrhosis, as the obstructive agent, does not exist at the time of splenectomy it will not appear subsequently. Cirrhosis exists in more than half of the cases as the obstructive factor; in the remainder the obstruction to the portal flow lies elsewhere. Extrahepatic lesions responsible for congestive splenomegaly are many and varied. Thrombosis of the portal or splenic veins may occur as a result of injury or infection and Banti's disease, typical in all respects, may result. Other obstructive lesions may be cavernomatous transformation of the portal vein, compression of the splenic vein by tumors and scars and defects in the portal vein, such as anatomic developmental defect, a thrombosis occurring at the time of birth coincident with the thrombosis of the umbilical vein and stenosis. The syndrome is considered as a chronic congestive splenomegaly, a term suggested by Larrabee.

Treatment of Hypertension.—Allen and Adson state that, since hypertension is produced by increased resistance to the flow of blood through the arterioles, the specific need in medical treatment is a preparation which will restore arteriolar resistance to normal and which will not produce harmful or unpleasant side effects. Such a preparation is not available at present. Rest and the reduction of nervous stresses and strains are advisable. Young persons who follow occupations that are strenuous from a nervous standpoint may well consider it advisable to change to an occupation that is more restful. However, methods of medical treatment (diet, drugs, restriction of alcohol, curtailment of smoking and the like) available today are unsatisfactory so far as reduction of blood pressure is concerned. Sympathectomies have been performed in the hope that they may modify the mechanism by means of which blood pressure is elevated in essential hypertension. The results of operation can be predicted with reasonable certainty by observing the response of the blood pressure to rest and sleep, to the ingestion of sodium amytal and to intravenous injection of pentothal sodium. When poor results are predicted from these tests, operations are almost uniformly unfavorable. Likewise when good results are predicted some patients do not receive the anticipated benefit from operation. There were no operative deaths among a series of 300 cases. The operation itself does not disable, although anhidrosis of the lower extremities and loss of ejaculation and probably of fertility of the male patient results. Female patients have borne children subsequent to the operation. Clinical symptoms invariably disappear when the blood pressure is reduced, but a number of patients continue to

be free from symptoms even though elevated blood pressures gradually return. The results justify continuance of the operation. Individuals who will receive most benefit from surgical intervention are those who seek treatment early in the course of this progressive disease, before irreparable damage has resulted to the cardiac, renal and vascular tissues.

Annals of Surgery, Philadelphia

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- Congenital Anomalies of Duodenum.* J. B. deC. M. Saunders and H. H. Lindner, San Francisco.—p. 321.
- Further Observations on Diagnosis and Treatment of Gastric Lesions.* C. W. Holman and W. R. Sandusky, New York.—p. 339.
- Retrograde Enteric Intussusception.* M. J. Groper, San Francisco.—p. 344.
- *Diverticulitis of Colon, with Special Reference to Surgical Complications.* E. E. Arnheim, New York.—p. 352.
- Production of Hypermotility and Hypomotility of Musculature of Small Bowel in the Human: Experimental Studies on (A) Normal Peristaltic Activity, (B) Effect of Morphine, (C) Effect of Atropine.* A. C. Forster, St. Louis.—p. 370.
- *Adenoma of Islets of Langerhans, with Hyperinsulinism, Associated with Adenoma of Thyroid.* D. P. Greenlee, J. G. Lloyd, A. J. Bruecken and W. S. McEllroy, Pittsburgh.—p. 378.
- Congenital Hemolytic Jaundice: Report of Case with Normal Fragility and Normal Reticulocyte Count, Cured by Splenectomy.* A. G. Hurley and W. C. Moore, Muncie, Ind.—p. 392.
- Acute Cholecystitis Preceding Neoplastic Common Bile Duct Obstruction.* R. E. Rothenberg and S. G. Aronson, Brooklyn.—p. 400.
- Studies on Absorption of Sulfanilamide from Large Intestine: Results Following Administration of Suppositories.* R. Turell, A. W. M. Marino and L. Nerb, Brooklyn.—p. 417.
- Struma Lymphomatosa (Hashimoto): Report of Two Cases.* J. E. Kearns Jr., Evanston, Ill.—p. 421.
- *Bilateral and Bilocular Empyema.* A. A. Ehler, Albany, N. Y., and G. N. J. Sommer Jr., Trenton, N. J.—p. 426.
- Treatment of Perianal Tuberculosis.* E. Granet, New York.—p. 440.
- Internal Derangements of Knee Joint: Analysis of 100 Cases with Follow-Up Study.* L. K. Ferguson and W. D. Thompson, Philadelphia.—p. 454.
- Some Physical Factors Regarding Catgut Ligatures and Catgut Knots: Preliminary Report.* C. F. Horine, Baltimore.—p. 471.

Diverticulitis of Colon and Surgical Complications.—Arnheim lists the following complications of diverticulitis of the colon that require surgical intervention: (1) peritonitis resulting from passage of organisms through inflamed diverticula without perforation, (2) perforation of inflamed diverticula, (3) fistula formation, (4) peridiverticulitis, (5) metastatic suppuration and (6) carcinoma arising from diverticula. A review of literature shows that surgical complications of diverticulitis of the colon occur in more than half of the cases in the following incidence: peridiverticulitis 20 per cent, abscess 19 per cent, peritonitis 12 per cent and sigmoidovesical fistula 8 per cent. From 1927 to 1937 thirty-five cases of diverticulitis of the colon were admitted to the surgical services of the Mount Sinai Hospital. Surgical complications were not present in sixteen. The incidence of surgical complications in the remaining nineteen was as follows: peritonitis without perforation in two, abscess in five, perforative peritonitis in five, stenosis (peridiverticulitis) in four, sigmoidovesical fistula in two and associated carcinoma in one. The ages of the patients in the uncomplicated group ranged from 50 to 83 years (average 69) and in the complicated ones between 18 hours and 73 years (average 51 years). The diverticulitis of the colon in the 18 hour old infant is the earliest on record. The symptoms in the uncomplicated cases were, in the order of frequency, pain in the lower part of the abdomen, constipation, diarrhea, blood in the stools and vomiting. The symptomatology in the complicated cases was determined by the type of complication present. The sigmoid was the most frequent site of the disease, though perforation of a diverticulum of the splenic flexure occurred twice. Operation was not performed in the uncomplicated cases; they subsided under conservative therapy. The operative mortality was 62 per cent. There was one death in the two cases of peritonitis without perforation. Three deaths occurred among the five cases with perforation and abscess. A gangrenous inflammation of the abdominal wound and tissues surrounding the operative site contributed to the fatal issue in one case. The two other patients were in a poor condition; drainage of their large multilocular abscesses did not influence the course of the disease. Four of the five patients with advanced diffuse peritonitis died. Two of these patients were so toxic that operation was not performed; the third death was that of the 18 hour old infant, and the

fourth patient was operated on within a few hours of admission without adequate preoperative therapy. Two deaths occurred among the four cases of peridiverticulitis. One patient had an advanced intestinal obstruction. He refused operation and died the day after admission. The other patient had a primary resection of the sigmoid with an end to end anastomosis. There was no necropsy, but clinical evidence indicated peritonitis. The two patients with sigmoidovesical fistulas died. Death in one was due to leakage of the end to end anastomosis suture line and peritonitis. The other patient had advanced perisigmoidal suppuration. The patient with associated carcinoma died of a peritonitis secondary to the perforation of the diverticula of the sigmoid.

Adenoma of Islets, Hyperinsulinism and Adenoma of Thyroid.—Greenlee and his collaborators report a case in which coexisting hyperfunction of an adenomatous goiter and an adenoma of the islets of Langerhans was corrected by appropriate operations. Biologic assays of the tumor tissue removed from the pancreas proved its insulin activity. The most important clinical feature of hyperinsulinism was that attacks of coma or unconsciousness came on when the patient had abstained from food for some time or had exercised; the coma-like episodes were relieved spectacularly by the administration of sugar. The sugar tolerance curve following operation resembles a diabetic curve. It is conceivable that the patient has a pancreatitis with disturbance in her remaining islet tissue and has a mild degree of diabetes. This would fit in well with the fact that both cholelithiasis and hepatitis were found at operation. Episodes of unconsciousness were undoubtedly of hypoglycemic origin. The patient appeared to be definitely hyperthyroid. There was nothing to prove or disprove that the thyroid disturbance was secondary to the hypoglycemia. It was felt that operation on the thyroid was indicated first because (1) any tendency to a hypoglycemic reaction following it could be controlled by dextrose and (2) there was some possibility that the patient's extreme emaciation, presumably due to hyperthyroidism, might have so lowered tissue glycogen that a hypoglycemic state resulted. A left lobectomy was performed. The pathologic report was cystic adenoma of the thyroid and hyperplasia. The patient made a satisfactory convalescence save for one spell of coma about one week postoperatively. She responded quickly to coffee and sugar. In more than a year she had had only two episodes of complete unconsciousness, but she had had several seizures which were averted by the timely administration of sugar. In view of the incomplete relief of the symptoms, the patient was readmitted to the hospital for exploration of the pancreas. A tumor about 1.5 cm. in diameter was found situated in the body of the pancreas near its junction with the tail lying close to the inferior border. The gallbladder contained stones and there was moderate hepatitis. Exploration of the rest of the upper part of the abdomen was negative and no further tumors were found in the pancreas. The patient made an uneventful convalescence save for moderate ileus for a few days. Blood sugar determinations on the third and seventeenth postoperative days were 179 mg. and 94 mg. respectively. A blood sugar determination made about five weeks after operation was 95 mg. The last blood sugar determination, April 15, 1939, was 90 mg.

Bilateral and Bilocular Empyema.—According to Ehler and Sommer, 418 patients with thoracic empyema due to pyogenic organisms following infections of the respiratory passages were admitted to the University of Michigan Hospital from 1925 to August 1938. There were twelve of bilateral empyema; three were chronic, while nine were acute at the time of admission. Four of these patients did not receive treatment, as the condition was not recognized until after they died. Of the eight treated patients with bilateral empyema, one was cured by bilateral aspiration. Three patients were treated with aspiration alone on one side and with open drainage, following aspiration, on the contralateral side. Aspiration followed by bilateral drainage was employed for one patient, three weeks intervening between the drainage operations. Prolonged aspiration was deemed unnecessary for the one chronic case; the two sides were drained two days apart following diagnostic taps. One patient, an infant of 18 months, died. The child was admitted

with bilateral empyema of four months and in extremely poor general condition. Following aspiration for two days, both sides were drained by an efficient airtight technic at one operation; the child died four days later of advanced malnutrition in spite of transfusions and other efforts to improve his condition. The eighth patient was admitted with empyema on the right side, while on the left side there was an apparently uninfected pneumothorax with multiple bronchopleural fistulas, which had developed following drainage of a previous empyema on the left side; the drainage tract was healed. Cure of the empyema on the right side followed drainage and after complete healing a left thoracotomy was performed with suture of the fistulas and airtight closure of the thoracic wall without drainage; the left lung slowly reexpanded and complete recovery ensued. No cardiac or respiratory symptoms followed open drainage with the institution of efficient airtight drainage. Among the 418 cases there were thirteen of bilocular pockets in the same pleural cavity. One of these was admitted following drainage elsewhere, one developed in the hospital, one was of three weeks duration on admission, one of one month, three of six weeks, five of four months and one of fourteen months. Only three were considered early cases. In only five cases, including three in which the diagnosis was made during operation, was it possible to institute double drainage through a single operative wound; in the remaining eight two incisions were necessary. Two patients died. The cause of one death was multiple actinomycotic liver abscesses and of the other it was osteomyelitis of the ilium. The recognition of multiple loculation depends on careful preoperative and postoperative study of postero-anterior and lateral or oblique roentgenograms whenever the condition is suspected from clinical and physical signs. The foci should be drained as they are recognized, either through the original or through supplementary incisions.

Archives of Dermatology and Syphilology, Chicago

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- Effect of Thiosulfate on Arsenic Excretion. Marjorie R. Mattice, H. Baxt and J. M. Byrne, New York.—p. 399.
Nature of Excitant of Poison Ivy Dermatitis. B. Shelmire, Dallas, Texas.—p. 405.
Pathology of Schistosome Dermatitis. S. Brackett, Chapel Hill, N. C.—p. 410.
Xanthoma Tuberosum and Myxedema: Report of Case. S. E. Sweitzer and L. H. Winer, Minneapolis.—p. 419.
Fungistatic Power of Blood Serum. S. M. Peck, II. Rosenfeld and A. W. Glick, New York.—p. 426.
Peniform Elephantiasis of Praeputium Clitoridis in Lymphogranuloma Venereum. W. E. Coutts and Olga Monetta, Santiago, Chile.—p. 438.
Erythema Elevatum Diutinum: Report of Case. F. C. Combes and S. M. Bluefarb, New York.—p. 441.
Pyoderma Chancriforme Faciei. G. V. Stryker, St. Louis.—p. 447.
Ehlers-Danlos Syndrome. J. Skeer and A. A. Kaplan, Brooklyn.—p. 450.
Neurosyphilis and Late Syphilis of Skin, Mucous Membranes and Bones. C. Shaw, Chattanooga, Tenn.—p. 456.
Comparison of Old Tuberculin (Koch) and Modified Tuberculin (Mellon and Reinhauser): Cutaneous Reactions in Persons with Hyperergic and with Anergic Tuberculodermis. L. Schwarzschild, New York.—p. 461.
*Effect of Ultraviolet Radiation on Roentgen Rays: Do Ultraviolet Rays Have Deleterious Effect on Roentgen Rays When Applied to Skin? F. A. Ellis, Baltimore, and H. Kirby-Smith, Washington, D. C.—p. 466.
The "Spiritual" Value of Syphilis. T. Schroeder, Cos Cob, Conn.—p. 470.
Frequency of Certain Dermatoses in High School Girls: Report on 4,700 Girls. Ida J. Mintzer, Jamaica, N. Y.—p. 475.

Effect of Ultraviolet Radiation on Roentgen Rays.—Ellis and Kirby-Smith believe that the former lack of adequately accurate measurements of dosage, mistakes in technic and overdosage are the main causes for roentgen ray sequelae and not a concomitant actinic dermatitis or/and a dermatitis due to external irritants. The combined application of roentgen rays and actinic rays should be repeated with all factors controlled by modern methods and standards of measuring dosage. In 1939 they examined eleven patients who had received from ten to sixteen one third erythema doses of roentgen rays and from four to twenty-one erythema doses of ultraviolet rays. All of the patients applied a two ply acne lotion to the treated areas. The time from the termination of treatment to the reexamination was from three to eight years. Nine patients have had subsequent roentgen and actinic

ray therapy. None of them showed any evidence of roentgen ray dermatitis; in fact, in half of them there was an excess of facial oil and in the majority some acne lesions still developed. The authors have replaced this routine of therapy during the last few years by a technic of giving approximately 70 roentgens weekly. They have continued to use the modified white lotion concurrently, without any evidence of roentgen ray sequelae. In their opinion the roentgen therapy has simply an additional action on actinic effect on the skin; for instance, if R represents the permanent or late roentgen ray effect and A the permanent actinic cutaneous change, then the total late changes will equal R plus A. When R and A are given simultaneously, alternately or later, neither exerts a beneficial or deleterious action on the other, but only a summation of one plus the other.

Archives of Ophthalmology, Chicago

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- Severe Uveitis with Associated Alopecia, Poliosis, Vitiligo and Deafness: Second Review of Published Records. W. R. Parker, Detroit.—p. 439.
- Clinical Evaluation of Tests of Dark Adaptation. R. McDonald and F. H. Adler, Philadelphia.—p. 447.
- Boeck's Sarcoid of Palpebral Conjunctiva. Martha Rubin Folk, Chicago.—p. 462.
- Management of Recurrent Trachoma Following Sulfanilamide Therapy: Chemotherapy Combined with Iontophoresis Therapy as Prophylactic Measure Against Recurrence. W. L. Cooper, Los Angeles.—p. 467.
- Angioid Streaks and Pseudoxanthoma Elasticum: Report of Case. J. Ziporkes, New York.—p. 473.
- Calcified Carotid Artery with Atrophy of Optic Nerve, Cupping and Low Tension: Report of Case. H. Elwyn, New York.—p. 476.
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- Iridodentation: Confirmation of Its Anatomic Basis by Fortin's Investigations on Glaucoma. R. Denig, New York.—p. 482.
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- Central Scotomas: Their Importance in Topical Diagnosis. F. B. Walsh and F. R. Ford, Baltimore.—p. 500.
- Ophthalmia Nodosa: Report of Case. F. N. Knapp, Duluth, Minn.—p. 535.
- Transcranial Extirpation of Fibrohemangioma of Orbit: Report of Case. B. F. Souders, Philadelphia.—p. 539.
- Simplified Operation for Keratoplasty. A. S. Green and M. I. Green, San Francisco.—p. 544.
- Operation for Spastic Entropion. R. E. Meek, New York.—p. 547.
- Pharmacodynamics of Intra-Ocular Muscles. J. S. Guyton, Baltimore.—p. 555.

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- Fifteen Year Survey of Sanatorium Cases. L. D. Phillips, Marshallton.—p. 171.
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- Present Status of Tuberculin Test. A. M. Dietrich Jr., Marshallton.—p. 174.
- The Midwife Problem. F. I. Hudson, Dover.—p. 176.
- Pneumonia in Delaware 1939-1940. J. R. Beck and T. E. Hynson, Dover.—p. 179.
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- Toxic Reactions from Bismuth Compounds Used in Treatment of Syphilis. T. E. Hynson, Dover.—p. 181.
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- Syphilis Tests: Delaware State Laboratory Approved. R. D. Herdman, Dover.—p. 188.

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- Rational Contribution to National Defense by the Medical Profession. E. F. Straub, Indianapolis.—p. 441.
- Early Treatment of Gunshot Wounds and Fractures. H. W. Orr, Lincoln, Neb.—p. 442.
- The Medical Service of the United States Army. P. R. Hawley, Carlisle Barracks, Pa.—p. 446.
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- Causes and Significance of Asphyxia of Newborn. W. C. C. Cole and D. C. Kimball, Detroit.—p. 425.
- Infectious Mononucleosis with Mild Leukemoid Reaction: Report of Case. D. J. Haines and H. H. Corn, Des Moines.—p. 430.
- Interpretation of Laboratory Reports in Serology of Syphilis. M. E. Barnes, Iowa City.—p. 431.
- Modern Treatment of Varicosities of Lower Extremities. S. A. Carnazzo, LeMars.—p. 433.
- Convalescent Scarlet Fever Serum in Otorhinologic Conditions. J. V. Treynor, Council Bluffs.—p. 436.
- Tracheobronchial Complications of Pulmonary Tuberculosis. R. C. Carpenter, Iowa City.—p. 440.
- Full Term Pregnancy in Broad Ligament. Arline M. Beal, Davenport, and Nellie S. Cassell, Guntur, South India.—p. 445.

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- *Sulfanilylguanidine: Chemotherapeutic Agent for Intestinal Infections. E. K. Marshall Jr., A. C. Bratton, H. J. White and J. T. Litchfield Jr., Baltimore.—p. 163.
- Gynecogenic Action of Desoxycorticosterone in Rhesus Monkey. H. Speert, Baltimore.—p. 189.
- Innervation of Blood Vessels as Observed in Urinary Bladder. O. R. Langworthy and F. H. Hesser, Baltimore.—p. 196.
- Coronary Arteries in Relation to Sudden Death During Anesthesia. R. H. Follis Jr., Baltimore.—p. 211.
- *Observations on Ineffectiveness of Oral Administration of Potassium Chloride in Various Forms of Allergy. F. F. Furstenberg and L. N. Gay, Baltimore.—p. 219.

Sulfanilylguanidine for Intestinal Infections.—In a study of various sulfonamide derivatives Marshall and his colleagues found that sulfanilylguanidine is fairly water soluble but is poorly absorbed from the intestine. This makes possible a high concentration of the drug in the intestine and a low concentration in the blood and tissues, a situation somewhat analogous to the use of sulfonamide derivatives as urinary antiseptics. They present data on the preparation, structure, chemical and physical properties, pharmacology, experimental therapy and possible clinical uses of this drug. The antibacterial activity of sulfanilylguanidine suggests that it or some other derivative having similar properties may prove useful in the treatment of infections mainly or entirely localized in the intestine. From their experiments on dogs, mice and rabbits it appears that the drug given orally is no more toxic and is probably less toxic than sulfapyridine and sulfathiazole. The drug is conjugated in the mouse, rabbit and man but not in the dog. It passes into the spinal fluid much more slowly than do sulfanilamide and sulfapyridine. It rapidly penetrates the tissues with the exception of the brain. Sulfanilylguanidine is somewhat less effective against a beta-hemolytic streptococcus infection in mice than is sulfanilamide, but it is as effective as sulfapyridine against pneumococcal infection in mice. In vitro studies show that it is as or even more effective than sulfanilamide against various bacteria. The concentration of coliform bacteria in the feces of mice can be reduced by its administration. The pharmacologic properties of the drug suggest that it may prove effective in the treatment of bacterial intestinal infections in man. However, evidence of its therapeutic capabilities can be obtained only by a careful clinical study. The solubility of the drug, accompanied by its low absorption from the intestine, would appear to constitute its chief advantage over the sulfonamide derivatives in use at present. The rapid excretion of the drug is a definite advantage. Acetylation of sulfanilylguanidine is no disadvantage, since acetylation does not occur in the intestine, but probably increases the toxicity of the drug.

Ineffectiveness of Potassium Chloride in Allergy.—The remarkable results of Bloom and Abt with potassium chloride in allergic disorders prompted Furstenberg and Gay to observe its effect on eighty-five patients manifesting allergic symptoms; fifty complained of pollen hay fever, seventeen of perennial allergic rhinitis, three of rhinitis due to physical or functional factors, six of chronic angioneurotic edema and urticaria, four of eczema and five of asthma. The potassium chloride was given in tablet, powder, capsule and liquid form. Therapeutic results were not affected by the mode of administration. Several patients had epigastric pain when the salt prescribed in tablet form had not been diluted with water at the time of ingestion. The salt was given in daily doses of from 15 to

80 grains (1 to 5.2 Gm.). Most of the patients were given the medication for one week, and a few for as long as one month. Results were almost uniformly poor irrespective of the type of allergic disorder observed. The authors believe that if potassium chloride is an effective therapeutic agent in allergic diseases its best effects should be among hay fever patients who come under observation for the first time while they are suffering acute symptoms during the pollen season. However, their observation shows its failure in this group. A few patients who thought they were more comfortable after taking potassium chloride derived equal comfort when, unknown to them, sucrose was substituted. Likewise potassium chloride was of no benefit to those patients with severe symptoms of hay fever in spite of adequate preseasonal treatment with pollen extracts. Similarly, few of those patients presenting perennial allergic rhinitis showed substantial improvement. Slight improvement was noticed by two patients but psychotherapeutic factors or spontaneous changes in the natural course of the disturbance may have been responsible for the improvement. None of the patients with physical rhinitis, angioneurotic edema, urticaria or eczema derived benefit from potassium chloride. Six patients—four treated coseasonally with potassium chloride and two treated preseasonally with pollen extract and then given potassium chloride—had asthma during potassium medication. It is the authors' opinion that oral administration of potassium chloride has not proved of value in the treatment of allergic diseases.

Journal of Clinical Investigation, New York

19:685-794 (Sept.) 1940

- Mechanism of Excretion of Vitamin C by Human Kidney at Low and Normal Plasma Levels of Ascorbic Acid. G. J. Friedman, S. Sherry and Elaine P. Ralli, New York.—p. 685.
- Photoelectric Method for Quantitative Determination of Erythrocyte Fragility. F. T. Hunter, Boston.—p. 691.
- Inactivation of Thrombin by Plasma Protein. J. D. Stewart and G. Margaret Rourke, Boston.—p. 695.
- Alkalosis and Low Plasma Potassium in Case of Cushing's Syndrome: Metabolic Study. D. M. Willson, Marschelle H. Power and E. J. Kepler, Rochester, Minn.—p. 701.
- *Effectiveness of Peroral Insulin in Human Diabetes. J. R. Murlin, C. B. F. Gibbs, M. J. Romansky, T. B. Steinhausen and F. L. Truax, Rochester, N. Y.—p. 709.
- Bronchial Caliber Changes in Bronchiectasis. J. Greenfield, Columbus, Ohio.—p. 723.
- *Studies in Rheumatic Disease: V. Age at Onset of Primary Rheumatic Attack. R. L. Gauld and Frances E. M. Read, Baltimore.—p. 729.
- *Antibody Formation in Cases of Lobar Pneumonia Treated with Sulfathiazole. Y. Kneeland Jr. and Barbara Mulliken, New York.—p. 735.
- Relations of Effective Renal Blood Flow and Glomerular Filtration to Tubular Excretory Mass in Normal Man. W. Goldring, H. Chasis, H. A. Ranges and H. W. Smith, New York.—p. 739.
- Glomerular Dynamics in Normal Human Kidney. H. W. Smith, H. Chasis, W. Goldring and H. A. Ranges, New York.—p. 751.

Peroral Insulin for Diabetes.—Murlin and his co-workers studied the effect on twenty patients with diabetes of varying severity of hexylresorcinol and a buffering mixture of salts on the absorption of insulin from the alimentary tract. The "standard dose" was 100 international units of pure insulin in a solution containing 0.125 per cent hexylresorcinol and alkaline salts necessary to give a pH of approximately 10 to 10.5. As many as eight such standard doses can be given in one day without interfering with digestion, the last dose being administered not later than 11 p. m. and the twenty-four hour urine period closing at 7 a. m. Diets were kept constant for control and experimental periods. Results on urine sugar for twenty-four hours and blood sugar change early in the morning from the first dose of oral insulin of the twelve patients who reacted most favorably (four of the remaining eight did not cooperate and the conditions of the test of the other four were not unimpeachable) show weighted average effects on urine sugar varying from 4.7 to 17.7 Gm. for twenty-four hours below the average excretion in control periods. The blood sugar effect from the single dose varied from nothing to 60 mg. per hundred cubic centimeters in forty-five minutes. The total insulin for twenty-four hours varied from 200 or 300 to 800 international units. The effects on urine sugar were not proportional to the dosage, often being as great after from 200 to 300 international units as after from 600 to 800 international units. Greater effects were obtained when urine sugar and fasting blood sugar were high than when they were

low. The equivalent unitage effects of oral insulin in terms of subcutaneous (regular) insulin varied from 2.1 to 22 international units, the average of patients of whom this assay was possible being for all doses of oral insulin just below 10 international units of subcutaneous insulin. The results, the authors say, are only mildly encouraging for the hope of adequately controlling diabetes mellitus with oral insulin.

Age at Onset of Rheumatic Disease.—Gauld and Read investigated the incidence of rheumatic disease (chorea, polyarthritis and carditis) in the parents, uncles and aunts of ninety-six unselected white rheumatic children admitted to a university clinic, emphasizing the age at which the first onset of the disease was observed. Of the total number of 971 members of this generation, 132 had definite histories of the disease in some form, but only for 115 could the age of onset be definitely ascertained. The incidence of rheumatic disease was found to be greatest between the ages of 5 and 14 and 25 and 34 years. In twenty of the fifty-one persons whose onset occurred before they were 15 years of age, the first manifestation was an attack of chorea, either alone or accompanied with rheumatic polyarthritis or rheumatic carditis. Persons with onset after their fifteenth year showed a reversal of this picture. Only once in sixty-four times did rheumatic disease manifest itself in the form of chorea, while rheumatic carditis made its first appearance in nine cases. The relative risk of developing the disease was determined by dividing the number of onsets at each age by the "person-years at risk" for the corresponding age to obtain an annual incidence rate. This computation gave an average annual rate of 5.25 per thousand between the ages of 5 and 14 and 4.6 per thousand between 25 and 34 years. The incidence rate for the other ages indicated a considerably lower percentage of from 2.1 to 3 per thousand. The authors concede the limiting factors inherent in their study such as the inaccuracy of the data involving primary appearance of the disease and the possibility that the disease occurred in uncles and aunts not domiciled in an infectious environment. Since rheumatic disease is comparatively rare in children less than 3 years of age, the failure to obtain information at these age levels does not, in their opinion, invalidate the results.

Antibody Formation in Pneumonia After Sulfathiazole.—Kneeland and Mulliken determined the antibody production in the serum of twenty-one patients treated with sulfathiazole for lobar pneumonia. They used the precipitin reaction with type-specific polysaccharide for the demonstration of antibody formation. Before the introduction of sulfathiazole they studied thirty cases of pneumococcal pneumonia treated with sulfapyridine. In twenty-two of these, nearly 75 per cent, recovery from the disease occurred without the appearance of an excess of antibodies. Among the twenty-one patients treated with sulfathiazole, circulating antibody was detected in sixteen. The time of the appearance of the antibody was accurately determined in thirteen instances and its relationship to the beginning of normal temperature is known. In six of these the antibody appeared so close to the moment of "essential recovery" as to indicate that it might be playing an important part in that process. In six others the antibody was not detected until about a week after the temperature had been normal and in the remaining one not until three weeks had elapsed. It seems to the authors that the importance of these observations lies in the fact that a sharp difference is established between the response of patients treated with sulfathiazole and those treated with sulfapyridine. The types of patients, severity of disease and time of treatment were approximately the same in the two groups. Therefore the authors feel justified in concluding that a real difference exists between the responses of patients treated with the two drugs. The explanation which they believe probable is that sulfapyridine is a somewhat more powerful antibacterial agent in human lobar pneumonia than is sulfathiazole and that this difference expresses itself quantitatively in the proportion of patients who show a greater activity of their immune mechanisms when treated with the newer drug. Support to this hypothesis is lent by the fact that the sulfapyridine-treated patients averaged 1.7 days of fever after treatment was begun, while those on sulfathiazole averaged 3.2 days.

Journal of Experimental Medicine, New York

72:217-330 (Sept.) 1940

- Inhibition of Bacteriostatic Action of Sulfonamide Drugs by Substances of Animal and Bacterial Origin. C. M. MacLeod, New York.—p. 217.
- Studies on Epidemic Influenza Virus: Nature and Properties of Complement Fixing Antigen. E. H. Lennette and F. L. Horsfall Jr., New York.—p. 233.
- Synergism of Human Influenza and Canine Distemper Viruses in Ferrets. F. L. Horsfall Jr. and E. H. Lennette, New York.—p. 247.
- Studies on Pathogenesis of Experimental Pneumococcal Pneumonia in Dog: I. Secondary Pulmonary Lesions: Relationship of Bronchial Obstruction and Distribution of Pneumococci to Their Inception. M. Hamburger and O. H. Robertson, Chicago.—p. 261.
- Id.: II. Secondary Pulmonary Lesions: Their Production by Intratracheal and Intrabronchial Injection of Fluid Pneumonic Exudate. O. H. Robertson and M. Hamburger, Chicago.—p. 275.
- Studies on Renal Arterial Blood Pressure and Metabolism of Kidney Tissue in Experimental Hypertension. M. F. Mason, C. S. Robinson and A. Blalock, Nashville, Tenn.—p. 289.
- Vasoconstrictor Action of Plasma from Hypertensive Patients and Dogs. I. H. Page, Indianapolis.—p. 301.
- Heterotransplantation of Frog Carcinoma: Character of Growth in Eyes of Alien Species. B. Lucké and H. Schlumberger.—p. 311.
- Effect of Temperature on Growth of Frog Carcinoma: I. Direct Microscopic Observations on Living Intra-Ocular Transplants. B. Lucké and H. Schlumberger, Philadelphia.—p. 321.

Journal of Infectious Diseases, Chicago

67:1-80 (July-Aug.) 1940

- Comparative Values of Certain Media for Isolation of Bovine Tubercle Bacilli. A. G. Karlson, Rochester, Minn.—p. 1.
- Host Influence in Characterization of Response to Papilloma Protein and to Vaccinia Virus. W. R. Bryan and J. W. Beard, Durham, N. C.—p. 5.
- Production of Bacteriogenic Hemagglutination. I. Davidsohn and B. Toharsky, Chicago.—p. 25.
- Interpretations of Neurotropic Virus Cell Inclusions, with Special Reference to the Negri Body. C. E. Black, East Lansing, Mich.—p. 42.
- Constant Antiserum Optimal Ratios Obtained with Rat Precipitin. G. P. Youmans and Charlotte A. Colwell, Chicago.—p. 48.
- Ascorbic Acid Concentration of Inflammatory Lesions of Skin. C. C. Torrance, Albany, N. Y.—p. 53.
- Influence of pH on Molecular Stability of Equine Encephalomyelitis Virus Protein (Eastern Strain). A. R. Taylor, D. G. Sharp and J. W. Beard, Durham, N. C.—p. 59.
- Action of Sulfathiazole on Colon-Typhoid-Dysenteriae Group of Organisms. R. L. Libby and A. L. Joyner, Pearl River, N. Y.—p. 67.
- Effect of Azochloramid on Certain Physiologically Active Products of Staphylococci. Margaret D. Heise and W. A. Starin, Columbus, Ohio.—p. 70.
- Serologic and Immunologic Studies of Group II Meningococcus Strains. Sophia M. Cohen, Albany, N. Y.—p. 74.

New England Journal of Medicine, Boston

223:307-352 (Aug. 29) 1940

- *Pellagra in Average Population of Northern States. H. Field Jr., C. Parnall Jr. and W. D. Robinson, Ann Arbor, Mich.—p. 307.
- *Direct Visualization of Placenta by Soft Tissue Roentgenography. A. L. Dippel and W. H. Brown, Baltimore.—p. 316.
- Subdural Hemorrhage in Patients with Mental Disease: Statistical Study. Anna M. Allen, M. Moore and Blanche B. Daly, Boston.—p. 324.
- *Clinical and Potential Allergy in Families with Allergic Children. J. Brem, Worcester, Mass., and A. Colmes, Boston.—p. 329.
- Transfusion Therapy: Review of Blood Groups, Transfusion Accidents, Hemolytic Reactions, Stored Blood, Transfusion Methods and Plasma and Serum Transfusions. T. H. Ham, Boston.—p. 332.

Pellagra in Average Population of Northern States.—Field and his associates point out that pellagra is not confined to alcoholic addicts and the Southern poor, among whom its severe manifestations are common, but lesser deficiencies, not accompanied by florid dermatitis, diarrhea or dementia, are common in the average Northern population. They are the cause of much impairment of health. One of the characteristics of chronic pellagrous dermatitis is hyperkeratosis. Common sites for hyperkeratoses are over skeletal pressure points: the knee, elbow, instep and front and back of the ankle. These lesions occur without known preceding acute lesions. The hyperkeratosis is occasionally nodular; it may have the roughness of sandpaper; there may be desquamation or the surface may be smooth and shiny. The hyperkeratotic often show pigmentation. Hyperkeratoses also occur over the soles of the feet. A fairly common hyperkeratosis is a more or less diffuse thickening of the skin over the fingers, especially the proximal phalangeal knuckles. Another common cutaneous manifestation is an ichthyosis-like change. These changes are easily overlooked or attributed to chapping. Ichthyosis is characteristically commoner and worse in the winter, and ichthyosis-like pellagrous scaling may be conditioned by

exposure to cold or heat. The usual site of ichthyosis-like changes is the anterolateral aspect of the calves, less frequently the forearms. When severe there may be a yellow-brown pigmentation. Lesser changes than a red, sore and atrophic tongue may suggest a pellagrous stomatitis. Occasionally the tongue is swollen and shows indentations from the teeth. It may appear normal except for redness with swelling of the fungiform papillae about the anterior edges and tip. Aphthous ulcers should always suggest the possibility of a pellagrous etiology. The nervous and mental symptoms, short of dementia or psychosis, are varied. Loss of energy, fatigability and weakness are usual complaints. Vertigo is common, as is uncertainty of balance, and sometimes staggering without vertigo. Paresthesias, such as numbness, burning or an itching or tingling sensation in the extremities and sometimes over the head, occur. A feeling of tenseness, irritability, mental depression, weeping without cause, insomnia, tremors and emotional instability are other common complaints. Constipation is perhaps the commonest and earliest gastrointestinal symptom. With a more severe deficiency, short spells of diarrhea may be interspersed with it. Abdominal discomfort after a small meal, sense of weight in the epigastrium or bloating are other signs. One of the most distinctive symptoms of a fairly severe deficiency is epigastric burning during or shortly after the ingestion of food, particularly acid food. An intrinsic etiology must be ruled out for the cause of the gastrointestinal symptoms. The authors found that doses of 60 mg. of synthetic nicotinic acid six times a day produced prompt results with no uncomfortable reactions until an adequate total dosage was determined. With such doses pronounced improvement in gastrointestinal and nervous symptoms should be obtained in less than a week. Chronic cutaneous lesions sometimes clear completely within two or three weeks. After the deficiency has been relieved, the diet should be improved so that further vitamin supplements will not be needed. Pellagra should be extended to those cases, lacking any cutaneous lesions, which have the same symptoms and are relieved by the same therapy. However, more important than the name is the recognition that such cases do occur, and not infrequently.

Visualization of Placenta.—Dippel and Brown used soft tissue roentgenography in examining 200 pregnant women. One fourth of these patients were so studied because of bleeding in the last trimester. The placenta was visualized in approximately 90 per cent of the cases; in the others deterring factors were present which rendered visualization difficult or impossible. Such factors were hydramnios, multiple pregnancy, unusual obesity of the mother and prematurity. Although with immature fetuses the chances of visualization are definitely reduced, the authors demonstrated the placenta clearly in a pregnancy advanced to only the twenty-fourth week. The position of the fetus does not deter good visualization. When the placenta is implanted over the lower uterine segment, its lower margin is usually not perceived. However, if one reasons that the normal placenta at or near term covers approximately one fourth of the surface area of the uterine wall, the probable type of placenta praevia may be diagnosed with reasonable accuracy. In a few of the patients the location of the placental site was checked at cesarean section or by vaginal examination, and in no case was the x-ray diagnosis erroneous. The future course of the pregnancy in all cases conformed to the x-ray diagnosis. Since the adoption of this technic, the number of vaginal examinations has been greatly reduced. After being roentgenographed, many patients are discharged to carry on the pregnancy and to be delivered normally at or near term. A single lateral roentgenogram is usually sufficient. Other applications of the technic offer possibilities. Before performing a cesarean section on a patient with an anteriorly located placenta, one might wish to take additional precautionary measures in the way of facilities for transfusion or to choose between a classic and a low cervical cesarean incision. Exact knowledge of the site of attachment before the insertion of bougies will guide one in selecting the anterior or posterior uterine wall for this and lessen the possibility of separation of the placenta. With the advent of soft tissue roentgenography the comparative thickness of the anterior uterine wall and the soundness of an old cesarean scar can

be determined. To date the authors have seen two cases in which the anterior uterine wall appeared irregularly thinned, and the patients were not permitted to go through normal labor. This thinning was subsequently confirmed at operation.

Clinical and Potential Allergy in Families.—Brem and Colmes determined the incidence of allergy among the families of forty allergic child patients whose relatives comprised 135 persons. Also seventeen persons of four normal families were studied. The study consisted of questioning about manifestations of past and present allergy, such as hay fever, vasomotor rhinitis, asthma, eczema, urticaria and angioneurotic edema. Cutaneous tests were made on each patient and relative alike. Forty (30 per cent) of the 135 relatives presented evidence of either present or past allergy. None of the seventeen members of the control families gave evidence in their histories of any of the common allergies. Data from cutaneous tests show that of the forty children with frank allergy 11 per cent of all the cutaneous tests were positive. Ten of the thirty-two fathers were allergic by history, and 5 per cent of the 360 cutaneous tests made on them were positive. On the other hand, the twenty-two nonallergic fathers showed an incidence of 2 per cent of positive tests. Likewise, the thirteen allergic mothers had three times as many positive tests as did the twenty-seven nonallergic mothers, 10 per cent and 3.4 per cent respectively, and the eight allergic brothers and nine sisters had a correspondingly higher ratio of cutaneous tests than did their forty-six nonallergic mates. In contrast to these results (more than 2 per cent) the total incidence of positive cutaneous reactions in the seventeen control members was less than 1 per cent. Potentially allergic persons are a challenge to the clinician. If allergy is to be successfully treated, it must be recognized before the disease has progressed to an advanced stage. The elimination of wheat, milk or feathers in a patient with corresponding positive cutaneous tests who has only minor symptoms, such as nasal stuffiness or a hacking cough, may ward off a much more serious illness, such as asthma or chronic sinusitis.

Northwest Medicine, Seattle

39:275-314 (Aug.) 1940

- Irradiation Treatment of Malignant Surface Lesions. S. Moore, St. Louis.—p. 278.
Thrombo-Angitis Obliterans. T. J. Fatherree and C. Hurst, Soap Lake, Wash.—p. 283.
Epilepsy: Observations on Treatment. F. Lemere, Seattle.—p. 289.
Deledang. T. E. P. Gocher, San Francisco.—p. 291.
Intracranial Gumma with Unusual Clinical Features: Report of Two Cases. G. A. C. Snyder, Spokane, Wash., and G. A. Rickles, Fort Steilacoom, Wash.—p. 292.

Ohio State Medical Journal, Columbus

36:921-1036 (Sept.) 1940

- Criteria for Diagnosis of Occupational Skin Disease. C. G. Lane, Boston.—p. 937.
Status Asthmaticus. M. London, Cleveland.—p. 945.
Potassium Chloride in Hay Fever and Other Allergies: Personal Study of Ninety-Seven Cases. D. L. Engelsner, New York.—p. 949.
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Clinical Gout. F. S. Coombs, Youngstown.—p. 951.
Shock Treatment in Schizophrenic and Affective Psychoses. D. A. Johnston, Cincinnati.—p. 955.
New Colostomy Bag. W. G. Clagett, Dayton.—p. 958.
Etiologic Factor in Peptic Ulcer. G. S. Lamkin, Sardinia.—p. 959.
Surgical Procedure in Treatment of Ophthalmia Neonatorum. M. E. Scott, Massillon.—p. 960.
Gangrene of Hand Due to Nearsphenamine Injection: Case Report. L. H. Newman, Washington, D. C., and H. D. Giles, Columbus.—p. 961.
Management of Hemorrhage in Pregnancy. R. K. Ramsayer, Canton.—p. 963.
Examination of the Normal Child. G. C. Malley, Zanesville.—p. 967.
Record Card for Industrial Cases. A. Marcus, Cleveland.—p. 971.
Cardiac Murmurs in Children. Louise W. Raub, Cincinnati.—p. 973.

Rocky Mountain Medical Journal, Denver

37:637-716 (Sept.) 1940

- Hormones and Their Functional Importance. A. H. Smith, Detroit.—p. 654.
Sterility in the Male. R. W. Dickson, Denver.—p. 659.
Value of Bronchoscopy in Pulmonary Tuberculosis. H. I. Laff, Denver.—p. 662.
Gonococcal Infections in the Male Associated with Hypospadias. H. H. Lamleron, Colorado Springs.—p. 668.
Surgical Conditions of Knee Joint. C. L. Wilmoth, Pittsburgh.—p. 672.
Functional Disorders of Colon. S. S. Kauvar, Denver.—p. 676.

Southern Surgeon, Atlanta, Ga.

9:617-696 (Sept.) 1940

- Ventral Hernias: Study of 550 Hernias and 458 Repairs. H. J. Shelley, Fort Worth, Texas.—p. 617.
Some Commonly Seen Fracture Cases in Which Bad Results Frequently Occur. Leslie Rush and Lowry Rush, Meridian, Miss.—p. 657.
Surgical Treatment of Cardiospasm. R. B. Bailey and E. L. Jones, Wheeling, W. Va.—p. 666.
Fractures of Neck of Femur Treated by Internal Fixation with Adjustable Nails: End Result Studies. A. T. Moore and J. T. Green, Columbia, S. C.—p. 684.

Surgery, Gynecology and Obstetrics, Chicago

71:257-408 (Sept.) 1940

- *Relation of "Chronic Mastitis" to Carcinoma of Breast. S. Warren, Boston.—p. 257.
Spleen Extract in Treatment of Transplanted and Spontaneous Malignant Tumors in Mice. R. Lewisohn, R. Leuchtenberger and D. Laszlo, New York.—p. 274.
*Pelvic Peritonitis in Female Infants and Children. G. C. Schauffer, Portland, Ore.—p. 286.
Tuberculous Anal Abscess and Fistula: Criteria for Diagnosis. C. L. Martin and H. C. Sweany, Chicago.—p. 295.
Dysgerminoma of Testicle: Clinical and Pathologic Study of Thirty Cases. J. D. Kirshbaum and M. B. Jacobs, Chicago.—p. 297.
Treatment of Patent Urachus: Report of Seven Cases. H. Dudgeon Jr., Waco, Texas.—p. 302.
*Pathogenesis and Mechanical Prophylaxis of Venous Thrombosis. R. Frykholm, Karlshamn, Sweden.—p. 307.
Vitamin B₁ Deficiency in Pregnancy as Indicated by Test for OBT Principle (the Substance Denoting the Blood Level of Vitamin B₁). O. Horwitz and D. L. Farley, Philadelphia.—p. 313.
Surgical Treatment of Gastroduodenal Ulcerations: Technic of Gastric Resection. M. E. Steinberg, Portland, Ore.—p. 317.
Technic of Paravertebral Alcohol Injection: Methods and Safeguards in Its Use in Treatment of Angina Pectoris. J. C. White, Boston.—p. 334.
Interlaminar Removal of Protrusions of Intervertebral Disk at Fourth and Fifth Lumbar Interspaces. W. B. Hamby, Buffalo.—p. 344.
Cancer of Floor of Mouth. H. E. Martin and E. L. Sugarbaker, New York.—p. 347.
Complete Technic of Hemorrhoidectomy. C. Baumeister and L. Moon, Omaha.—p. 360.
Strictures of Male Urethra and Trichomonas Vaginalis. L. W. Riba and R. M. Harrison, Chicago.—p. 369.

Relation of Chronic Mastitis to Mammary Carcinoma.

—Warren studied the relation of cancer to operations for benign noninfectious mammary lesions in 1,206 women. Of these 602 were operated on at the Toronto General Hospital and 604 at five Massachusetts hospitals. The follow-up for the majority of the patients was more than five years. Among all the chronic mastitis and chronic cystic mastitis cases (1,044) there occurred thirty-five cancers, representing a total exposure of 9,393 risk years. This gives the high rate of 3.35 per hundred as a crude rate, and 0.37 per hundred as a corrected or annual attack rate, taking the follow-up period into consideration. This contrasts with an average mortality rate of 0.029 per hundred, which is based on the Massachusetts female population in 1930, or a morbidity rate of 0.058 per hundred. When the age specific cancer attack rates per thousand risk years of the chronic mastitis group are calculated and contrasted with those per thousand risk years of the Massachusetts female population it is seen that the cancer rate for women with pre-existing breast lesions is 4.5 times as great as for all women. This predominance is especially marked between 30 and 49 years of age, when it is 11.7 times as great. Once a woman who has had chronic mastitis reaches the menopause, the chance of breast cancer developing is not much greater than that of any one, but until that time she is in far greater danger of having breast cancer than is the woman whose breasts have been apparently normal. This is despite the fact that the most abnormal or even all the abnormal tissue has previously been supposedly removed by surgical intervention. Actively proliferating lesions, intraductal papillomas and cysts with papillary epithelium were followed by cancer more often than the adenofibromas or large cysts with atrophic epithelium. In the light of the data presented it is impossible not to regard the woman who has chronic mastitis as being especially subject to the risk of cancer of the breast at some later date, should her mammary tissues be allowed to remain. There are two courses open: One, the more radical (and the less desirable), is to advise the patient to permit amputation of both breasts, as when the process has involved one breast it may well involve the other. The other alternative is, after removal of the definitely diseased tissue, to have her breasts carefully

checked at least every six months for evidence of abnormality. If encountered it should lead to a simple unilateral mastectomy if the lesion is benign and radical mastectomy if it is proved malignant. Even if not cancerous, the mastitic process will probably recur in breast tissue permitted to remain. Not only is the hazard of carcinoma real, but the persistence of the mastitic process is most striking. If intraductal papilloma or adenocystoma is encountered, simple mastectomy should be seriously considered. Other similar lesions may be present in the rest of the breast, and the transition to cancer is relatively easily made. Careful pathologic study is required to determine whether or not the epithelium is invading the surrounding tissue.

Pelvic Peritonitis in Female Children.—Schaufler encountered nine cases of primary pelvic peritonitis among 371 instances of genital infections in female children and infants. The youngest of the nine children was 3 and the oldest 14 years of age. Of the entire group 259 patients presented frank vaginal infections, of which 53 per cent were proved positive for gonorrhea and an additional 33 per cent suggested a gonorrheal origin. Three of the diagnoses were not clearly established, four were definite and two were highly suggestive. Six were frankly gonorrheal. The most serious case that came to operation was proved nongonorrheal. A severe pelvic inflammatory reaction developed in one child while under treatment by hypodermic theelin. Another had a typical pelvic flare-up in the presence of a gonorrheal vaginitis following a rectal injection of an antiseptic for associated gonorrheal proctitis. Two patients were suspected of having mild pneumococcal peritonitis but were not bacteriologically studied. Two were operated on and justify the conclusion that the very much higher incidence of appendicitis over pelvic infection in female children should be an important immediate consideration for operation. With the patient in good condition, less harm may be done by a mistaken operation for suspected appendicitis than by deferring operation under a mistaken diagnosis of primary gonorrheal pelvic inflammation.

Pathogenesis and Prophylaxis of Venous Thrombosis.—Frykholm states that his pathologico-anatomic investigations show that four areas of origin of incipient thrombosis are found: (1) the plantar veins, (2) the veins of the musculature of the calf, (3) the veins of the adductor musculature and (4) the visceral pelvic veins. From these areas the thrombosing process follows the blood stream. The four areas are influenced by some special local factors connected with the patient's position in bed and these factors gradually lead to injury of the intima of the vein. Three general conditions for the development of a thrombus must be considered: (1) a slowed down blood stream, (2) changed chemical composition of the circulating blood and (3) injury to the intima. The first two factors merely contribute to the pathogenesis and alone cannot give rise to a thrombus. The composition of the blood is changed in all morbid conditions and also after apparently aseptic operations. The blood acquires an increased tendency to coagulate. The changed chemical composition of the blood can by no means explain why a thrombus so often arises just within the four areas of origin. On the other hand, a sufficiently severe injury to the intima, even without the association of other factors, can always give rise to a thrombosing process. With a patient confined to bed the calves lie pressed flat against the mattress. The adductor region likewise is exposed to similar mechanical pressure. It is just these two groups of muscles which are least used by patients in bed. When a patient is confined to bed the greatest diminution of the flow of arterial blood is to the musculature of the calves and the adductor muscles. In an erect position the veins are distended to the maximum with blood. In a lying position the pressure on the veins diminishes and the veins collapse more or less completely. The collapse of the veins in the calf and adductor regions should be great, as they are also exposed to mechanical pressure. Therefore intima will lie pressed against intima, while a minimal stream of blood will percolate onward through a cracklike lumen which remains open in some part of the vessel. There is every reason to suppose that a somewhat prolonged contact of two intimal layers gradually produces an injury to the endothelium, thus bringing about a fundamental condition for the formation of

a small thrombus. From the surface of this thrombus substances are given off to the passing blood and these promote coagulation so that layer after layer of the blood mass becomes coagulated. The process moves with the circulating blood until finally a vein that was pressed together becomes completely distended with the thrombotic masses. The same explanation can be offered for the two other sources of thrombi, the plantar veins and the pelvic veins. Under normal conditions the plantar veins are kept distended by the highest blood column existing in the human body. In many persons confined to bed these veins will usually lie collapsed. In the pelvis meteorism, pregnancy and the like, possibly in conjunction with a failing circulation, may cause the veins to be insufficiently distended. If such pathogenesis is correct, then the prophylactic measures now employed must be altered. The method used by the author for a number of surgical and delivery cases which had been considered especially hazardous with regard to thrombosis was as follows: For from one to two hours daily the head of the patient's bed was elevated by placing the two head-legs on chairs. The movements made by the patient to maintain his position necessitates the use of the musculature of the calves and adductors. The venous pressure in the extremities rises and helps distend the veins. The position causes slight discomfort to the patient. None thus treated developed thrombi. As a further argument the author points out that as a rule the patient who remains free from thrombi is the one who is up and about a few days after operation. Patients should be placed in a position which resembles the upright as far as possible, and not in a position with the legs high. Before a patient is allowed to get up, the areas in which a thrombus usually develops must be palpated carefully. Palpation of the calf should be carried out with the two knees symmetrically semiflexed. The medial-posterior part of the thigh is thoroughly palpated bimanually. A slight increase in consistency or tenderness in deep-lying parts within this area is a valuable early symptom of thrombosis.

West Virginia Medical Journal, Charleston

36:393-440 (Sept.) 1940

- Remedial Speech. E. C. Armbricht and F. Hipps, Wheeling.—p. 393.
Diagnosis and Management of Unusual Presentations During Labor. H. H. Ritter, Montgomery.—p. 403.
Common Sense in Public Health Administration. H. A. Smith, Wheeling.—p. 406.
*Treatment of Infectious Diarrhea with Sulfapyridine: Case Reports. A. J. Villani, Welch.—p. 414.
Cerebral Cysts. H. J. Erwin, Lakin.—p. 420.

Sulfapyridine for Infectious Diarrhea.—Villani used sulfapyridine for the treatment of sixteen severe cases of infectious diarrhea in children from 2 months to 3 years of age. The condition was characterized by extreme high temperature and vomiting, the diarrhea being a watery green, tinged with blood and mucus. The infants were markedly dehydrated and, despite the prompt restoration of fluids and electrolytes, signs of bronchopneumonia, extreme cyanosis, pallor and marked respiratory embarrassment with a terminal pulmonary edema developed. As soon as the vomiting was controlled by elixir of phenobarbital, orange juice and physiologic solution of sodium chloride the patients were given boiled skim milk, sulfapyridine and small amounts of kaolin and camphorated tincture of opium. Physiologic solution of sodium chloride by hypodermoclysis, sips of orange juice and physiologic solution of sodium chloride by mouth control the vomiting, which as a rule is caused by the acidosis and dehydration. Patients were also given physiologic solution of sodium chloride enemas for abdominal distention and starch enemas for tenesmus. As soon as vomiting ceased infants were given a lactic acid milk formula and children, who respond rather promptly to this form of therapy, were given cereals, bread, custards and very ripe bananas in addition to their sulfapyridine medication. The author feels certain that in his sixteen cases sulfapyridine was a specific chemotherapeutic agent, as within twenty-four to forty-eight hours of the first dose of the drug the temperature dropped to normal and shortly thereafter the stools returned to normal. There was one death; the sulfapyridine was discontinued because the infant was unable to retain the drug. No serious complications were encountered. The minimal dose of the drug was administered.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2:213-244 (Aug. 17) 1940

- *Fate of Extracorporeal Circulating Hemoglobin. N. H. Fairley.—p. 213.
*Rapid Method of Differentiating Children with Large or Small Reserves of Vitamin C. J. Pemberton.—p. 217.
Eosinophilia in Tuberculosis. A. M. Gill.—p. 220.
Osteomalacia and Dental Caries. G. F. Taylor and C. D. M. Day.—p. 221.
Ether Convulsions. H. Bailey.—p. 222.

Fate of Extracorporeal Circulating Hemoglobin.—

Fairley determined the fate of the extracorporeal circulating hemoglobin that is added to the circulation when blood and blood substitutes are transfused. Following the intravenous injection of from 14 to 25.4 Gm. of human hemoglobin a positive Schumm reaction was invariably demonstrated in the plasma within four to ten hours and persisted for twenty-four hours or longer. A transient increase in bilirubin was also present in the plasma of two of his three subjects receiving hemoglobin injections. Though the author could not demonstrate methemalbumin spectroscopically following the injection of these amounts of hemoglobin, it was demonstrated in the plasma of two patients who through an error were given incompatible blood containing approximately 45 and 90 Gm. of hemoglobin, respectively. In incompatible transfusion and the other intravascular hemolyses in man, methemalbumin and not methemoglobin is found in the plasma; a mixture of the two pigments has never been recorded in vivo, though they do occur together in vitro when a human plasma-hemoglobin mixture is incubated at 37 C. The conclusion reached from these investigations and from an extensive clinical study of hemoglobinurias and hemolytic anemias is that extracorporeal circulating hemoglobin is treated as a foreign substance in the body and that it disintegrates and is eliminated in as short a time as possible. The three mechanisms, depending on the concentration of extracorporeal hemoglobin attained in the circulation, called into action for this purpose are (1) absorption by the reticulo-endothelial system, (2) intravascular catabolism of hemoglobin and (3) renal excretion. It is suggested that hemoglobin disintegrating in the circulation is first split into globin and reduced hematin (ferrous); the latter pigment is immediately oxidized to hematin (ferric), which in man combines with serum albumin to form methemalbumin.

Rapid Method of Determining Reserves of Vitamin C.

—Pemberton presents experiments carried out to discover whether the concentration of vitamin C in a single specimen of urine passed four hours after a test dose of ascorbic acid would reveal the vitamin C reserves. Studies of the daily concentration of vitamin C in the urine of a normal adult were made eight days before and ten days after a test dose of 700 mg. of ascorbic acid. The subject had a diet which contained approximately 70 mg. of ascorbic acid daily. The average concentration of vitamin C before the test dose was 1.72 mg. per hundred cubic centimeters. Following the marked increase in concentration of vitamin C in the urine on the day of the test dose the concentration fell rapidly, and on the third day after the test dose the concentration in five out of six specimens was less than 2.3 mg. By the eighth day all the concentrations were less than 2 mg. and the total daily excretion was 19.9 mg. During the week following the test dose increases up to 7 mg. occurred on several occasions after the consumption of small amounts of fruit, showing a high degree of saturation in the tissues. The method employed in determining the concentration of vitamin C in the urine was the same as that described by Harris and Ray (1935). The study showed that the concentration in a given specimen of urine bore little relation to its volume but a definite relation to previously eaten fruit. In specimens passed between four and eight hours after the test dose there was a great increase in the concentration. The maximal concentration of 27.7 mg. was reached six hours after the test dose. In the twelve hours following the test dose 245.1 mg. of ascorbic acid was excreted. On the basis of these data the author believes that a subject whose diet contains moderate amounts of fresh fruit and vegetables will respond

to a test dose of ascorbic acid by yielding a high urinary concentration of vitamin C from four to eight hours after its ingestion. If this overflow occurred it might be presumed that the tissue requirements of vitamin C were being met, but if a massive dose of ascorbic acid produced no increase in concentration it would suggest that the tissues were depleted of vitamin C. To verify this hypothesis a test dose of ascorbic acid was given sixty-two orphan boys from 10 to 14 years of age who lived in an institution and whose diet was known. During the year immediately preceding the experiment half of the boys had been receiving additional dietary supplements, including a daily orange, as part of the Carnegie United Kingdom dietary and nutritional survey. The supplemented diet contained approximately 63 mg. of vitamin C per head daily, while that of the group on the basic orphanage diet contained approximately 35 mg. The boys on the lower intake did not respond to a test dose of ascorbic acid. The boys on the higher intake yielded a high concentration of vitamin C in the urine following a test dose of ascorbic acid. Therefore it may be presumed that there was no marked lack of vitamin C in the tissues of the latter and that a daily orange added to a diet containing approximately 35 mg. of vitamin C will in time produce a concentration in the tissues which is near saturation point. It is suggested that a child who responds to a test dose of ascorbic acid (50 mg. per stone [14 pounds, or 6.4 Kg.] of body weight) by yielding a marked concentration of vitamin C in the urine four hours later is receiving an adequate amount of vitamin C. If there is no response it may be inferred that the vitamin is being taken up to be stored and/or utilized and that there is a lack of vitamin C in the tissues. Whether this degree of lack is harmful it is impossible to say but, according to certain studies on infections, a child should not be considered adequately nourished unless there is an abundance of vitamin C in the tissues, determined by its overflow in the urine after a test dose of ascorbic acid.

Glasgow Medical Journal

16:31-62 (Aug.) 1940

- Is There a Gastrointestinal Ataxia? J. B. M. Anderson and J. H. Pringle.—p. 31.
Superior Mediastinum in Its Clinical Aspects: Special Reference to Signs of Aneurysm of Transverse Aorta: Record of 110 Cases. W. K. Anderson.—p. 42.

Lancet, London

2:185-218 (Aug. 17) 1940

- Psychology of Mutilation and Disablement. E. Guttmann and W. Mayer-Gross.—p. 185.
Sulfathiazole and Sulfamethylthiazole in Gonorrhea. V. E. Lloyd and D. Erskine.—p. 186.
Congenital Duodenal Atresia Successfully Treated by Operation. S. Feggetter.—p. 188.
*Epidemic of Paratyphoid. T. Anderson.—p. 189.
Antiscorbutic Values of Fruits and Vegetables. Mamie Olliver.—p. 190.
*Simultaneous Immunization Against Whooping Cough and Diphtheria. H. Schütze.—p. 192.
Flow Regulator for Continuous-Drip Blood Transfusion. H. L. Marriott and A. Kekwick.—p. 193.
Penetrating Wounds of Chest: More Experiences in the Last War. C. Gordon-Watson.—p. 194.
Estimation of Prothrombin: Simplified Method. H. W. Fullerton.—p. 195.
Cerebrospinal Fever: Report of Thirty-One Cases Treated with Sulfapyridine and Meningococcus Antitoxin. J. M. Todesco.—p. 196.
Gangrene in Scarlet Fever. G. E. Breen.—p. 196.

Epidemic of Paratyphoid.—Anderson reports an epidemic of paratyphoid in Glasgow in March 1940 which lasted only four weeks and during which time 126 cases were admitted to the hospital, 70 per cent in the first week. The diagnosis was confirmed by bacteriologic study. In March 1936 Glasgow also had an epidemic of paratyphoid but its spread was over a period of twelve weeks with a peak in the sixth week. This suggests to the author that in the first epidemic a cause was operative over a protracted time, while in the latter the cause was a common one and it was operative over a short time. The high incidence of abdominal pain, vomiting and diarrhea (almost 50 per cent) favor a food poisoning type of infection—a "paratyphoid gastro-enteritis." The classic clinical characteristics of the enterica group (rash in eighty-one cases, enlargement of

spleen in eighty-eight and meteorism in seventy-one) were often encountered. In many cases the rash was profuse.

Simultaneous Whooping Cough and Diphtheria Immunization.—Through experiments on guinea pigs and rabbits, Schütze finds that whooping cough vaccine and alum precipitated diphtheria toxoid when administered simultaneously do not interfere with each other in their antigenic effects. In fact he says the effect of the toxoid is increased by the pertussis vaccine. He believes that it may be both convenient and effective to immunize children simultaneously against diphtheria and whooping cough.

Schweizerische medizinische Wochenschrift, Basel

70:777-800 (Aug. 17) 1940

Current of Fluid in Blood, Tissue Clefts and Lymph Channels. O. Müller.—p. 777.

Pathology of Auricular Rhythm and of P Deflection. E. Attinger.—p. 782.

*Anemias with Inner Bodies Caused by Formation of Methemoglobin After Use of Sulfapyridine. S. Moeschlin.—p. 786.

*Sulfapyridine in Treatment of Children with Pneumonia. W. Trachsler.—p. 791.

Assay of Various So-Called Physiologic Solutions in Microbiology. H. Jeanneret.—p. 793.

Historical Aspects of Iodine-Deficiency Theory. E. F. Podach.—p. 794.

Inner Bodies in Erythrocytes Caused by Sulfapyridine.—According to Moeschlin, cyanosis, which is frequently observed in patients treated with sulfapyridine or related substances, is ascribed by many investigators to the formation of methemoglobin. The fact that the spectroscopic search for methemoglobin is often negative in these cases is without significance, since concentrations of from 10 to 15 per cent are necessary in order to be detectable by this method. Prolonged and intensive treatment with sulfapyridine results in anemia. In the course of studies on a patient who developed a severe cyanosis during treatment with large doses of sulfapyridine the author observed, after vital staining with brilliant cresyl blue, the appearance of inner bodies in the erythrocytes. He made a systematic search for inner bodies in other patients treated with sulfapyridine and discovered in the same week four other cases in which inner bodies existed. The detection of inner bodies furnishes an indirect proof of the formation of methemoglobin in sulfapyridine therapy, because the appearance of large numbers of inner bodies has been observed only during methemoglobinemia. The observations prove also that the anemias developing in the course of treatment with sulfapyridine or related preparations are of hemolytic type. The author reports observations on the sternal marrow and on the reticulocytic reaction of two cases which demonstrate that the anemia is caused by a peripheral impairment of the erythrocytes and not by toxic impairment of the erythropoiesis in the bone marrow. The hemolyzing effect of sulfapyridine is demonstrated also by severe changes in the blood picture such as the appearance of spherical microcytes, severe anisocytosis, polychromasia and erythrocytes with basophil stippling. In one of the author's cases the formation of inner bodies (methemoglobin) led to such severe changes that a blood transfusion was necessary to counteract them. The author concludes that the blood picture should be controlled for inner bodies by examination with vital stains when large doses of sulfapyridine are given, when renal elimination is impaired and in cases of severe cyanosis. The appearance of inner bodies in a small percentage of erythrocytes is probably a frequent occurrence; it involves no particular danger but indicates that caution is necessary. When inner bodies appear in more than 200 per thousand erythrocytes the drug should be continued only in exceptional cases and under careful supervision. The appearance of inner bodies in 500 per thousand makes threatening complications and severe hemolysis likely.

Sulfapyridine in Children with Pneumonia.—According to Trachsler sulfapyridine was employed in 150 cases at the children's clinic in Zurich, 138 of which were cases of pneumonia. The fever disappeared within forty-eight hours after the treatment was begun in 88 per cent of the cases of lobar and focal pneumonia, in 50 per cent of the cases of bronchopneumonia, in 75 per cent of those children in whom the pneumonia developed after measles and in 50 per cent of those in whom the pneumonia complicated whooping cough. Sulfapyri-

dine exerted no noticeable effect on fully developed empyemas, but small effusions were promptly counteracted by it. On the basis of three cases the author suggests that the recurrence of pneumonia in the same child may be connected with the sulfapyridine treatment. Excluding the three patients who were moribund at the time of hospitalization, the mortality rate was 3.6 per cent. The daily dosage of 1 Gm. of sulfapyridine for each 10 Kg. of body weight proved effective; however, in nurslings it might have to be increased. Exanthems developed in four cases, but vomiting involved no difficulties. The author directs attention to the danger of giving inadequate doses at the onset of the medication. The diazo reaction of the urine is positive during the treatment with sulfapyridine.

Revista Argentina de Reumatologia, Buenos Aires

5:121-150 (Aug.) 1940

Number of Rheumatic Children With and Without Cardiopathies Received During 1938 in the Hospitals of the Federal Capital. J. M. Macera, A. P. Ruchelli and R. Gaig.—p. 121.

*Behavior of Erythrocyte Sedimentation in Tonsillectomized Rheumatic Patients: Need of Preoperative Precautions. G. Costa Bertani.—p. 134.

Blood Sedimentation Before Tonsillectomy in Rheumatic Patients.—The frequency of uneventful routine tonsillectomies, according to Costa Bertani, induces a sense of security that may lead to postoperative complications if performed on rheumatic patients. He advises that the degree of active infection be gaged by sedimentation tests systematically given before surgical intervention, in order to prevent allergic shock and untoward reactions. Salicylic acid therapy capable of controlling pain in articular rheumatism and presenting an afebrile and apparently cured clinical picture does not constitute a sufficient indication. Observations based on a number of cases (eleven reported) showing a high erythrocyte sedimentation level (Katz formula) signified a high degree of toxic reabsorption. Patients who showed a low sedimentation level before operation presented the same picture after the operation and vice versa. In several cases in which the sedimentation count had been high, even a tooth extraction activated a return to higher levels, thus showing a clear connection between erythrocyte tests and infectious activity. Because of the correlation between high blood levels and infection, the author believes that tonsillectomy is contraindicated in the presence of articular rheumatism in full evolution unless all other therapeutic measures have failed. Serious articular or visceral complications may ensue if tonsillectomy is practiced on patients with a high sedimentation index though the clinical picture shows improvement.

Semana Médica Española, San Sebastian

3:1015-1040 (Aug. 17) 1940

*Nephrosis Due to Calcium Deposits in Pyloric and Duodenal Stenosis. E. Pérez Castro.—p. 1016.

Azoxulfamide in Two Cases of Tuberculous Meningitis. M. Sancho Lobo.—p. 1025.

Calcification Nephrosis in Pyloric and Duodenal Stenosis.—Pérez Castro investigated at necropsy fifty patients who died with manifestations of pyloric and duodenal stenosis after an antemortem history of prolonged vomiting involving serious loss of sodium chloride, together with fifty others who died from a variety of diseases. The uniform microscopic picture in five of the first group was a more or less pronounced accumulation of calcium deposits in the lumen of the uriniferous tubules, the epithelium of which was either flattened or had completely disappeared. In one case the calcification was covered with a new epithelial growth protruding from the canalicular lumen. In another case clinically and chemically diagnosed intra vitam as hypochloremia and treated with sodium chloride, no epithelial loss nor calcium deposits were observed, but only a serious albuminous degeneration of the tubular epithelium. Here the lesions secondary to hypochloremia had been checked by sodium chloride therapy. The author believes that renal lesions accompanying pyloric or duodenal stenosis are due to hypochloremia of which azotemia and uremia are only aggravated stages and that functional and morphologic renal changes coexisting with hypochloremia have heretofore been insufficiently investigated. In only three cases of the second group was some renal calcification found, but nephrotic lesions were absent.

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THE MANAGEMENT OF INTESTINAL OBSTRUCTION

AN EVALUATION OF CONSERVATIVE THERAPY

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Nonoperative or conservative treatment of intestinal obstruction often leads to favorable and dramatic results. Because some authorities have stated that intestinal obstruction is invariably a surgical condition, we have felt it perhaps worth while to review the cases of intestinal obstruction encountered in the past year and to consider critically the value of conservative treatment.

The majority of reports that deal with nonsurgical decompression are concerned with acute obstruction of the small intestine. This study consists of the results obtained from treatment in cases of intestinal obstruction encountered at the Mayo Clinic from Aug. 1, 1938, to July 31, 1939, inclusive. All types of obstruction are included, acute, chronic, simple and strangulated, in both the large and the small bowel. Our chief purpose in this review is to obtain a broader and more inclusive evaluation of the role of conservative therapy.

Since the advent of aseptic surgery there have been two major advances in the treatment of intestinal obstruction: the demonstration of the value of parenterally administered fluids by the work of Hartwell and Hoguet,¹ MacCallum,² Haden and Orr,³ Dixon,⁴ Gamble and Ross,⁵ and the discovery of a method for decompressing the distended intestine by oral or nasal intubation as elaborated in the writings of Westermann,⁶ Ward,⁷ Wangensteen,⁸ Miller,⁹ Abbott,¹⁰ John-

ston¹¹ and others.¹² Aside from the inherent worth of these two therapeutic measures, their study and development have led to a better understanding of the problem of intestinal obstruction. The application of these principles together with the development of improvements in surgical technic has led in our experience to a great reduction of the mortality rate, which was formerly appallingly high.

The relative success of present day methods of dealing with intestinal obstruction as compared with the results of a decade or more ago is apparent in the mortality statistics of most large hospital services, such as those reported by vanBeuren and Smith,¹³ Scudder, Zwemer and Whipple,¹⁴ Kennedy and Hanson¹⁵ and others, and from the observations of other surgeons who have observed the transition.¹⁶

MATERIAL

The work at hand embraced a study of the patients, hospitalized during a period of one year beginning Aug. 1, 1938, who were found to have objective clinical evidence of intestinal obstruction at the time of admission or shortly thereafter. Cases of ileus attributable to operative procedures carried out during the patients' stay in the hospital were not included in this study. Patients who gave a history of obstructive episodes but did not present objective evidence of intestinal obstruction or patients whose only objective evidence of intestinal obstruction was found at operation were not included in this series. Obstructions situated proximal to the jejunum were omitted from this analysis.

METHOD OF STUDY

All cases were divided into two main groups, after the method of Wangensteen,¹⁷ simple obstructions and

peptic Problem in Bowel Obstructions.¹⁷ Wangensteen, Rea, Smith and Schwyzer.²⁰

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From the Division of Medicine (Dr. Bargaen) and the Division of Surgery (Dr. Dixon), the Mayo Clinic.

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strangulation obstructions. There were 133 of the former and thirty-three of the latter, a total of 166 cases. In table 1 the cases of obstruction are classified according to their etiology. The most common single cause of simple obstruction was carcinoma of the sigmoid or rectosigmoid; postoperative adhesions occupied second place. The indeterminate group included

TABLE 1.—Classification of Cases of Obstruction on the Basis of Etiology

I. Simple obstruction	
A. Mechanical	
1. Narrowing of lumen	
a. Stricture (inflammatory, traumatic and neoplastic)....	97
b. Obturation (gallstone).....	1
c. Compression (ileal cyst, mesenteric tumor).....	2
d. Bands and adhesions.....	23
B. Nervous imbalance	
1. Adynamic (carcinoma of cervix with peritonitis).....	1
C. Indeterminate	10
II. Strangulation obstruction	
A. Mechanical	
1. Hernia (external and internal).....	17
2. Volvulus	8
3. Intussusception	6
4. Bands and adhesions.....	2
B. Vascular (mesenteric thrombosis).....	1

cases in which there was thought to be a large functional element, cases in which, because of recovery without operation, the true cause was never determined, and three cases of the so-called enterorenal syndrome.¹⁸ Among the strangulation obstructions, inguinal hernia was the most common cause.

SIMPLE OBSTRUCTION

In table 2 the cases are classified according to the segment of bowel involved. We have divided these into three groups: cases in which the small bowel was the site of obstruction, cases in which the large bowel was obstructed and, finally, cases in which the whole intestine was distended because of adynamic ileus or in which the true nature and level of obstruction was not accurately determined.

Simple obstructions are customarily further classified as acute or chronic, complete or incomplete and early or late. However, as Morton¹⁹ has pointed out, the most important single factor in determining what treatment should be employed and what the outcome is likely to be is the general condition of the patient at the time of observation. This is the resultant of all other factors. In this study we have graded all simple obstructions as of high, medium or low grade. This grading was arbitrary, independent of the site of obstruction and determined on the basis of (1) the degree of distention, (2) the amount, duration and character of vomiting, (3) the duration and degree of obstipation, (4) the evidence obtained from a simple roentgenogram of the abdomen, (5) alterations in the blood chemistry and (6) the amount of colic and the character of peristalsis. Table 2 further indicates the incidence of the various grades of obstruction in the small bowel group, in the large bowel group and in the miscellaneous group.

MODE OF ONSET OF SYMPTOMS

The onset of symptoms tended to be acute or subacute in obstructions of the small bowel, whereas with obstructions of the large bowel there was a greater tendency to chronicity. In all groups the obstructions of high grade were more likely to be associated with an

acute or subacute onset than were the obstructions of low grade, in which the symptoms tended to be chronic or intermittent.

DURATION OF SYMPTOMS

The duration of symptoms ranged from a few hours to one or two years. The duration of certain symptoms was taken into consideration in determining the grade of obstruction. The duration of an acute attack could not always be correlated with the grade of obstruction: the duration of a chronic attack seldom could be so correlated.

DISTENTION

The degree of distention present, in general, corresponded with the grade which was assigned to the obstruction. The distention tended to be greater when associated with obstructions of the large bowel than with obstructions of the small bowel.

OBSTIPATION

The extent to which the bowels were "locked" to passages of fecal material varied considerably. In some of the obstructions of high grade a paradoxical diarrhea was present. In some of the chronic obstructions of low grade, days had passed without normal evacuation.

VOMITING

Vomiting was a prominent symptom in all groups but it occurred more commonly with obstructions of the small bowel (77.8 per cent) than with those of the large bowel (60.5 per cent). Fecal vomiting occurred with four of the high grade obstructions of the small bowel and with four of the high grade obstructions of the large bowel. Fecal vomiting occurred in one of the cases of low grade colonic obstruction as a result of the presence of a gastrojejuno-colic fistula.

BLOOD CHEMISTRY

The increased tendency for vomiting to occur with obstruction of the small bowel was reflected in the greater incidence of alterations in the blood chemistry in this group. Abnormal values for blood urea, chloride or carbon dioxide combining power were noted in 62.5 per cent of the obstructions of the small bowel and in

TABLE 2.—Simple Obstructions

Obstruction		Cases, Number and Percentage	Percentage of Total (133 Cases)
Site	Grade		
Small bowel.....	High.....	17 (37.8)	77.8
	Medium.....	12 (26.7)	
	Low.....	16 (35.6)	
		45	
Large bowel.....	High.....	32 (43.1)	60.5
	Medium.....	23 (30.3)	
	Low.....	21 (27.6)	
		76	
Miscellaneous....	High.....	4 (33.3)	9.0
	Medium.....	3 (25.0)	
	Low.....	5 (41.7)	
		12	

50.9 per cent of the obstructions of the large bowel. That vomiting was not the only factor concerned was indicated in the preponderance of cases of acidosis over cases of alkalosis. Our observations were in accord with those of Falconer,²⁰ who pointed out that the most constant change and the one which gives the best index of the true condition of the patient is the elevation of the blood urea resulting from the increased metabolism of endogenous protein which occurs in the

18. Wakefield, E. G.; Mayo, C. W., and Bargen, J. A.: Ileus Associated with Transient Renal Insufficiency: A True Enterorenal Syndrome, *J. A. M. A.* 104: 2235-2239 (June 22) 1935.
19. Morton, J. J.: Factors Determining the Selection of Operation in Obstruction of the Small Intestine, *Surgery* 1: 848-858 (June) 1937.

20. Falconer, M. A.: Clinical Aspects of the Blood Chemistry in Intestinal Obstruction, *Proc. Staff Meet., Mayo Clin.* 13: 460-464 (July 20) 1938.

presence of intestinal obstruction. This elevation varied directly with the grade of obstruction. The loss of chloride varied with the amount of vomiting. The level of the carbon dioxide combining power, as Falconer pointed out, was variable but in general in the presence of decreased chlorides it was elevated (alkalosis) and in the presence of normal values for chloride it was normal or decreased (acidosis). Under the influence of satisfactory treatment, whether conservative or surgical, the blood chemical values returned to normal, the urea usually more slowly than the other values.

PRECIPITATING FACTORS

The optimal time for operating on patients who have intestinal obstruction is in the interval between attacks in recurrent cases or, in any case, before the obstruction has become high grade in character. Accordingly, a search was made to determine if there were any factors responsible for the recurrence of attacks of obstruction or the exacerbation of attacks already in progress which could be avoided. It was found that six bouts of obstruction of the small bowel and nine bouts of obstruction of the large bowel had unquestionably been precipitated by the oral administration of barium sulfate for roentgenologic study. In four additional cases, barium sulfate had been given but the responsibility did not fall clearly on it. In two cases of obstruction of the large bowel and in one case in the miscellaneous group, bouts of obstruction followed the introduction of barium sulfate into the rectum. In one additional case the inability to recover adequately the barium thus administered might have played a role. Barium was not the only offender. Three attacks of small bowel obstruction and one of large bowel obstruction came on the heels of a strong purgative administered to prepare the patient for subsequent roentgenologic study.

Thus, in 133 cases of simple obstruction, the precipitation of an attack of obstruction in twenty-two cases (16.5 per cent) was caused by the administration of barium sulfate or too violent purgation and in an additional five cases (3.8 per cent) the barium seemed to be a factor in precipitating an obstruction. The hospital mortality of these twenty-seven cases was 33 per cent. Wangenstein²¹ has long emphasized the disasters which may follow the incomplete taking of a history, perfunctory physical examinations and too great dependence on laboratory data in cases of intestinal obstruction. Nowhere is this more clearly demonstrated than in these cases in which impaction of barium caused obstruction, cases seen with appalling frequency in spite of the repeated warnings of Dixon,²¹ Vernon David²² and others.

CONSERVATIVE THERAPY

All food and liquid orally is withheld in cases of obstruction of high grade. A "residue-free" diet (Bargen and Sister Victor²³) is permitted in the cases of low grade obstruction. Sedatives and antispasmodics are administered when it is felt that there is no danger of masking signs of impending perforation. Hot stupes are found to add materially to the comfort of patients. Rectal irrigations with warm physiologic solution of sodium chloride have proved especially valuable for obstruction of the large bowel. When the condition of the patient permits, these irrigations are administered

with the patient in the knee-chest position. By using this method, we have been able to relieve many obstructions of the large bowel after numerous unsuccessful attempts had been made by the use of ordinary enemas before the patient was admitted to the hospital. Cautious purgation with small doses of a saline laxative is employed in cases in which the obstruction is not complete. Balances of fluids and electrolytes are carefully maintained by the accurate charting of fluid intake and output and frequent blood chemistry determinations (urea, chlorides, carbon dioxide combining power). Intubation of the stomach or duodenum with continuous suction applied to the tube is employed in most obstructions of high grade and many of those of medium grade.

The Sawyer-Willson modification of the Miller-Abbott⁹ tube was used instead of the duodenal tube in a number of the cases of this series. Our experience with the tube in this group of cases is indicated in

TABLE 3.—Intestinal Intubation

Site of Obstruction	Number of Cases	Tube Used	Passage of Tube Difficult	Function of Tube		Final Results of Conservative Therapy	
				Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory
Small bowel	45	16	7 (15.6%)	12 (26.7%)	4 (8.9%)	12 (26.7%)	4 (8.9%)
Large bowel	76	20	6 (7.9%)	14 (18.4%)	6 (7.9%)	11 (14.6%)	9 (11.8%)
Miscellaneous	12	3	2 (16.7%)	2 (16.7%)	1 (8.3%)	3 (25.0%)	0
Total	133	39	15 (11.3%)	28 (21.1%)	11 (8.2%)	26 (19.6%)	13 (9.8%)

table 3. There was some difficulty in passing the tube in more than a third of the cases; either because of lack of cooperation on the part of the patient or because of extreme distention or other factors, several attempts were required to get the tube beyond the pylorus. In a few cases the tube never went beyond the stomach. In designating "function of the tube satisfactory" it is meant that the tube descended into the small intestine and drained intestinal content. In most cases of obstruction of the small bowel in which this occurred the final results of conservative therapy were satisfactory, but in a few cases, although the tube worked well, decompression was not accomplished. In one case this was found at operation to be due to complete obstruction of the lower portion of the ileum by a coiled tube. Unsatisfactory function of the tube signifies its failure to leave the stomach or plugging of the tube after it is in place. In a few cases the final results of conservative therapy were good in spite of a malfunctioning tube. In the group of cases of obstruction of the large bowel there is seen to be a marked discrepancy between the function of the tube and the final results. This can be explained by the fact that in only two of these cases did the tube pass into the colon. In the remainder the ileocecal valve prevented the tube from emptying the colon, although the tube might be the means of achieving satisfactory decompression of the small bowel proximal to the colon. The latter observation is in keeping with the observations of Johnston,²¹ who found the entry of the tube into the colon too uncertain and slow to be dependable. However, by preventing the ingress of further material from the small bowel into the distended large bowel, the tube no doubt was a valuable aid in the cases in which decompression of the large bowel was satisfactory.

In one instance the tube became coiled in the lower portion of the ileum causing complete obstruction and,

21. Dixon, C. F., and Deuterman, J. L.: *Acute Intestinal Obstruction*, S. Clin. North America 17: 983-993 (Aug.) 1937.

22. David, V. C.: *Chronic Intestinal Obstruction Due to Lesions of the Large Bowel*, Surg., Gynec. & Obst. 64: 281-286 (Feb. 15) 1937.

23. Bargen, J. A., and Victor, Sister Mary: *Diet in Intestinal Disorders*, J. A. M. A. 97: 151-153 (July 18) 1931.

in another, there occurred collapse and general peritonitis soon after partial withdrawal of a tube the balloon of which could not be deflated.

High concentrations of oxygen, as recommended by Fine,²⁴ have been used in a few cases. In one case such treatment was attended by spectacular success but in a number of others it seemed to be without effect even though augmented by the more customary measures.

GENERAL RESULTS OF CONSERVATIVE THERAPY

The final results of conservative therapy at the time of its termination by operation, discharge or death are indicated in table 4. These were the clinical results and in most cases represented the opinion of the clinician in charge of the case and were not based on observations at operation or at necropsy. It will be seen that the results were satisfactory in the majority of

TABLE 4.—Immediate Results of Conservative Treatment in Cases of Simple Obstruction

Obstruction		Number of Cases	Benefited		Not Benefited	
			Complete Relief, Number and Percent- age	Partial Relief, Number and Percent- age	No Relief, Number and Percent- age	Condi- tion Worse, Number and Percent- age
Small bowel	High	17	7 (41.2)	4 (23.5)	3 (17.6)	3 (17.6)
	Medium	12	7 (58.3)	3 (25.0)	2 (8.3)	1 (8.3)
	Low	16	9 (56.3)	3 (18.8)	2 (12.5)	2 (12.5)
		45	23 (51.1)	10 (22.2)	6 (13.3)	6 (13.3)
Large bowel	High	32	11 (34.4)	4 (12.5)	6 (18.8)	10 (31.3)
	Medium	23	11 (47.8)	7 (30.4)	2 (8.7)	3 (13.0)
	Low	21	12 (57.1)	7 (33.3)	2 (9.5)	0
		76	34 (44.7)	18 (23.7)	10 (13.2)	13 (17.1)
Miscellaneous	High	4	3 (75.0)	1 (25.0)	..	..
	Medium	3	0	3 (100.0)	..	..
	Low	5	3 (60.0)	2 (40.0)	..	..
		12	6 (50.0)	6 (50.0)	..	..

cases of obstruction of the small bowel. The distribution of results was uniform in each of the three groups of cases of obstruction of the small bowel. In all cases in the miscellaneous group, benefit was derived. When we turn to the group of cases of obstruction of the large bowel, however, a striking contrast presents itself. The majority of the patients having obstructions of medium and of low grade were benefited; in fact, in a sizable proportion of these cases complete clinical relief was experienced. But, in the group of obstructions of high grade, more patients were unaffected by or actually harmed by the employment of conservative measures than were benefited. This, of course, is the group in which, because of a competent ileocecal valve and an obstructing lesion, one is dealing with what is essentially a closed loop.²⁵ It is the group against which warnings have been sent out by even the warmest advocates of conservative measures. Yet, at the same time, it is the group with which, because of the very poor condition

of the patient or the very good condition of the patient, one is most sorely tempted to temporize, although fully aware of the seriousness of the situation. It is hoped that this numerical demonstration of the fallacy of attempting conservative measures for high grades of colonic obstruction will serve to emphasize the importance of very careful continued observation in these cases and the employment of surgical intervention at the proper time. The proper time for operation may be at the moment when a patient is first seen, if the site of obstruction can be determined, or as soon thereafter as possible if no improvement is noted in the early hours of observation.

An interesting commentary on the results of conservative therapy is the fact that, in a group of forty-six cases in which complete relief of all signs and symptoms of obstruction occurred clinically and in which operation was then performed, twelve patients still exhibited marked distention of the bowel when the abdomen was opened. This should serve as a reminder to those who advocate radical operations in cases of recent obstruction that even in the face of complete clinical relief one is still not dealing with a normal bowel.

Complications Attending Conservative Decompression.—In the group of cases of obstruction of the small bowel, bronchopneumonia developed in one case and localized peritonitis developed in another, owing to a perforating type of lesion during the administration of conservative treatment. Serious complications were much more common in the group of cases of obstruction of the large bowel. Two patients experienced bronchopneumonia and five patients had localized peritonitis caused by subacute perforations of tumors or of the bowel proximal to the point of obstruction. General peritonitis occurred in six cases because of perforation of the colon proximal to an obstructing lesion and in one case because of the infection of ascitic fluid. In the miscellaneous group, pneumonia developed in one case. The fact that serious complications are limited almost exclusively to the group of cases of obstruction of the large bowel serves further to emphasize the hazards of temporization in dealing with grave obstruction of the colon. It is, of course, entirely possible that these complications may be the immediate results of the serious basic pathologic condition itself rather than the result of the attempt to relieve its symptoms.

OPERATIVE PROCEDURES

In the group of obstructions of the small bowel, emergency decompression by surgical methods was required in eight cases. In six cases ileostomy was performed; in one, ileostomy and colostomy were performed and in one an impacted gallstone was removed from the ileum; two of these patients died. In five cases no operation was performed because of complete relief of the obstruction by conservative methods. In one case operation was deferred because of the poor condition of the patient. In the remaining thirty-one cases, elective surgical procedures were performed. Obstructing bands or adhesions were released in ten cases, short-circuiting or decompressive procedures being added in four cases. No deaths followed these operations. Short-circuiting procedures were carried out in thirteen cases with two deaths. Resection of obstructing segments of bowel were carried out in five cases with one death. Three patients who had merely exploratory laparotomy died because of associated pathologic conditions. The group mortality for the

24. Fine, Jacob; Banks, B. M., and Hermanson, Louis: The Treatment of Gaseous Distention of the Intestine by the Inhalation of 95 Per Cent Oxygen: Description of an Apparatus for the Clinical Administration of High Oxygen Mixtures, *Ann. Surg.* 103: 375-387 (March) 1936.
25. Dixon, C. F.: Single and Closed Loop Intestinal Obstruction, *Proc. Staff Meet., Mayo Clin.* 11: 462-463 (July 15) 1936. Wangensteen,¹⁷ Wangensteen, Rea, Smith and Schwytzer.²⁰

thirty-nine cases in which operation was performed was 20.5 per cent.

In the group of obstructions of the large bowel, proximal surgical decompression was carried out in fifty cases, in thirteen of which the obstructing lesion was exteriorized at the same time. Eleven of these patients died. Short-circuiting procedures were carried out in two cases with two deaths. Exteriorization of the obstructed region was carried out in four cases without a death. Resection of obstructed segments with anastomosis of the bowel was carried out in three cases without a death. Exploratory laparotomy alone was carried out for one patient, who survived. The group mortality for the sixty cases in which operation was performed was 21.7 per cent. In sixteen cases in the group of obstructions of the large bowel operation was not performed: in seven because of relief of symptoms by conservative measures, in four because of the poor condition of the patient, and in five because death occurred before operation was performed.

In the group of cases of miscellaneous obstruction, exploration was carried out in one case. In eleven cases no operation was performed because of relief of symptoms by conservative measures. There were no deaths in this group.

With the exception of two cases in the group of large bowel obstruction and one case in the group of small bowel obstruction, all operative deaths occurred among individuals whose obstruction was of a high grade.

Secondary operations were carried out mainly among the patients who had had obstructions of the large bowel. Thirty-six operations were performed with a mortality of 8.3 per cent. Two patients who had obstruction of the small bowel survived secondary operations.

GROSS MORTALITY

The figures for gross mortality are presented in table 5. There were 133 cases with twenty-nine deaths, a mortality rate of 21.8 per cent. The mortality rate was 0 in the miscellaneous group, 17.8 per cent in the small bowel group and 27.6 per cent in the large bowel group. The mortality rate was directly proportional to the grade of obstruction in the large and small bowel groups, being highest, as would be expected, in the group of cases in which obstruction of high grade was present.

CAUSE OF DEATH

Peritonitis was the most common cause of death, being responsible for the demise of four patients who had obstruction of the small bowel and thirteen who had obstruction of the large bowel. Six patients with obstruction of the large bowel died of pneumonia, one of gastrointestinal hemorrhage and one of pulmonary edema. Two patients with obstruction of the small bowel died of carcinomatosis; one of ileus and one of pulmonary edema. None of the patients in the miscellaneous group died.

Comments on Simple Obstructions.—It has been demonstrated that conservative measures greatly improve the general condition of most patients who have intestinal obstruction. In certain cases conservative treatment obviates the need for surgical measures. The one group consistently resistant to these salutary effects is the group of patients with high grade obstructions of the large bowel.

Intubation is an invaluable agent in the treatment of obstructions of the small bowel and is a helpful adjunct to the treatment of obstructions of the large bowel.

Irrigations find their greatest value in the treatment of obstructions of the distal half of the colon.

Fluid and electrolyte balances can be maintained by the intelligent administration of fluids parenterally.

The time required for successful conservative therapy is relatively unimportant.

The time element assumes major importance when conservative therapy is not progressing satisfactorily. As Wangenstein²⁶ has pointed out, the longer conservative therapy is continued the greater the hazard to the patient if it fails. No arbitrary time limit can be stated for the use of conservative therapy.

For obstructions of low grade the amount of time spent with conservative measures is optional.

For high grade obstructions of the small bowel, operation should not be deferred if there is no improvement from conservative measures after twelve to twenty-four hours.

In cases of high grade obstructions of the large bowel, which are essentially closed loop obstructions,

TABLE 5.—Simple Obstructions; Mortality

Obstruction		Number of Cases	All Hospital Deaths, Number and Percentage	Post-operative, Number and Percentage	After Second Operation, Number and Percentage	Without Operation, Number and Percentage
Site	Grade					
Small bowel	High	17	7 (41.2)	7 (41.2)	0	0
	Medium	12	1 (8.3)	1 (8.3)	0	0
	Low	16	0	0	0	0
		45	8 (17.8)	8 (17.8)	0	0
Large bowel	High	32	16 (50.0)	11 (34.4)	2 (6.3)	3 (9.4)
	Medium	23	3 (13.0)	1 (4.3)	0	2 (8.7)
	Low	21	2 (9.5)	1 (4.8)	1 (4.8)	0
		76	21 (27.6)	13 (17.1)	3 (3.9)	5 (6.6)
Miscellaneous	High	4	0	..	..	..
	Medium	3	0	..	..	..
	Low	5	0	..	..	..
		12	0	..	..	..
Total cases		133				
Total deaths			29 (21.8)			

conservative temporization is extremely hazardous. The condition of the patient may be improved by gastric lavage, administration of fluids parenterally and of sedatives, but operation cannot safely be deferred.

In all cases of obstruction, if the condition of the patient becomes worse rather than better under conservative therapy, immediate operation should be performed.

STRANGULATION OBSTRUCTIONS

Since attempts at conservative decompression have no place in the treatment of obstructions due to strangulation, with the possible exception of occasional cases of volvulus or intussusception prior to the development of gangrene, the treatment and results in this group of cases will be given only brief consideration.

There were thirty-three patients. All were subjected to operation. There were eight deaths, making a group mortality of 24.2 per cent.

26. Wangenstein, O. H.; Rea, C. E.; Smith, B. A., Jr., and Schwytzer, H. C.: Experiences with Employment of Suction in the Treatment of Acute Intestinal Obstruction; A Reiteration of the Indications, Contraindications and Limitations of the Method, *Surg., Gynec. & Obst.* 68: 851-868 (May) 1939.

Time of Operation.—Immediate operation was carried out in twenty-four cases with a mortality of 20.8 per cent. Operation was delayed six hours or more in nine cases. The operative mortality in this group was $33\frac{1}{3}$ per cent.

Condition of Strangulated Loop.—The strangulated loop was found viable at operation in twenty-three cases, in 8.7 per cent of which death occurred. The viability of the strangulated loop was questionable in one case. This patient died. The strangulated loop was gangrenous in nine cases; five (55.6 per cent) of these patients died.

Relation of Condition of Loop to Time of Operation.—Among the twenty-four patients who were subjected to immediate operation, the strangulated loop was found at operation to be viable in seventeen cases (70.8 per cent) and gangrenous in seven (29.2 per cent). Among the nine cases in which operation was delayed six hours or more, the strangulated loop was viable in six cases (66.7 per cent), gangrenous in two cases (22.2 per cent) and questionable in one case (11.1 per cent).

Treatment.—The type of operation performed depended on the condition of the strangulated loop. In the twenty-three cases in which the loop was viable, simple relief of the obstructing mechanism was performed in seventeen cases with one death. In three cases this procedure was augmented by enterostomy as an added precaution; one of these patients died. In three cases spontaneous relief of the obstruction was found to have occurred. The one patient in whom the viability of the bowel was questionable died following reduction of a volvulus that involved the entire jejunum and a third of the ileum.

Among the cases in which the strangulated loop was gangrenous, exteriorization of the affected loop was carried out in two cases without a death. In two cases the procedure was augmented by enterostomy; one of these patients died. Resection of the strangulated loop with primary anastomosis of the bowel was carried out in four cases, with enterostomy proximal to the anastomosis. Three of these patients died. In one case, volvulus was discovered at necropsy. In most of the cases in which a hernia was present, repair was effected in the process of closing the exploratory wound.

Cause of Death.—Peritonitis was the cause of death in five cases. Surgical shock contributed to the outcome in two of these cases; pneumonia also was present in a third case. Shock alone caused two deaths. One patient died of uncomplicated pneumonia.

Comments on Obstructions Due to Strangulation.—The time element is very important in these cases. The longer operation is delayed the greater the likelihood that gangrene will develop or, if gangrene is already present, the greater the likelihood that general peritonitis will develop.

The presence or absence of gangrene determines the difficulty and extent of operation and the gravity of prognosis.

Operation should be performed in all obstructions due to strangulation as soon as the diagnosis is established in cases of external hernia or as soon as there is anything to suggest the diagnosis in cases in which there are internal lesions.

Loss of blood may be an important factor in obstructions due to strangulation, and transfusions are of great value in these cases.

SUMMARY

The results of treatment in 166 cases of intestinal obstruction were studied. This number included 133 cases of simple obstruction and thirty-three cases of strangulation obstruction. The incidence of avoidable precipitating factors to which bouts of acute obstruction could be attributed is relatively high. All patients who had simple obstruction were subjected to a period of conservative therapy for varying lengths of time before operation. In a number of cases this therapy obviated the need for surgical intervention.

The results of conservative therapy were found to be satisfactory in most cases of simple obstruction of the small bowel and of low and medium grade obstruction of the large bowel. The results of conservative therapy were distinctly unsatisfactory in high grade obstructions of the large bowel, and in certain of these cases the results were disastrous.

The recognition of high grade obstructions of the colon when they occur and the avoidance of dangerous temporization in such cases is important. The gross mortality rate for all cases of simple obstruction was 21.8 per cent. In the various groups the mortality rate was found to be directly proportional to the grade of obstruction. The treatment of the obstructions due to strangulation was strictly surgical. The mortality rate in this group was 24.2 per cent.

HEMORRHAGIC DIATHESIS OF
THE NEWBORNFURTHER OBSERVATIONS CONCERNING PRE-
VENTION AND TREATMENT

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It has been fifteen years since Dam¹ announced the discovery of vitamin K and described its antihemorrhagic properties. In the past two years we have seen proof of the valuable properties of this newcomer to the family of vitamins in two important clinical fields, namely the hemorrhagic state associated with obstructive jaundice and the hemorrhagic diathesis of the newborn. The rapid development in the chemical synthesis of vitamin K stands out as a landmark of accomplishment in the field of biologic chemistry.

In March 1939 we² recorded the cases of two newborn infants both with marked prothrombin deficiency. In one infant there was in addition unnatural bleeding. To each of these infants natural vitamin K concentrate was administered orally, and within the short interval of two hours the prothrombin deficiency appeared to have been corrected and bleeding in the one instance promptly was controlled. On the basis of these few facts we suggested that vitamin K might serve a specific purpose in the prevention and treatment of hemorrhagic

The vitamin K preparations used in this study were provided through the Abbott Laboratories and E. R. Squibb & Sons.

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Read before the joint meeting of the Section on Obstetrics and Gynecology and the Section on Pediatrics at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.
1. Dam, Henrik: *Biochem. Ztschr.* 215: 475, 1929; 220: 258, 1930.
2. Waddell, W. W., Jr.; Guerry, DuPont III; Bray, W. E., and Kelley, O. R.: Possible Effects of Vitamin K on Prothrombin Time and Clotting Time in Newly Born Infants, *Proc. Soc. Exper. Biol. & Med.* 40: 432 (March) 1939.

disease of the newborn. In April 1939 one of us³ described before the Society for Pediatric Research and later published in June 1939 certain additional data based on the study of ten control infants and ten K-treated infants to the effect that prothrombin deficiency and its associated bleeding were the direct result of avitaminosis K. We further stated at this time our belief that this same bleeding setup was perhaps present at birth and might in fact be responsible for certain cases of birth injury, particularly in those cases in which symptoms and signs of intracranial hemorrhage were late in developing. We suggested that, if prothrombin deficiency in the infant could be prevented by oral or parenteral administration of vitamin K to the mother, birth accidents might be materially lessened.

Over a period of one year we have made 2,232 prothrombin time and clotting time determinations on 191 control and 181 K-treated infants. These data have all been published or accepted for publication.⁴ We have further recorded additional cases of unnatural bleeding associated with hypoprothrombinemia, including that of hemorrhagic disease. Observations similar to ours have subsequently been reported by others working along identical lines.⁵ These additional data have verified in general the observations and therapeutic suggestions contained in our preliminary reports. The necessity of conserving space does not permit us to review again the fast accumulating data on this subject.

Our purpose in this article is to record additional facts of a laboratory, clinical and statistical nature concerning the hemorrhagic diathesis of the newborn and birth injury.

All prothrombin times were done by the Bray modification of Quick's method, which permits the use of capillary blood. Thromboplastin samples were prepared with acetone and all readings between fifteen and twenty-five seconds were considered as normal.

The top curve in chart 1 shows the average prothrombin time of 189 controls on admission at the end of twenty-four, forty-eight, seventy-two, ninety-six and 144 hours. It will be seen that the period of most marked deficiency occurred at the age of forty-eight and seventy-two hours. Of the 189 control cases, 111 showed some degree of prothrombin deficiency. In certain instances prothrombin deficiency was actually present in cord blood or shortly after birth.

The lower curve in chart 1 shows a similar prothrombin average for twenty-three premature infants. In this short series prothrombin deficiency was less apparent

than that of the full term infants. A forty-eight hour peak is apparent also in this group of infants.

Chart 2 shows the correlation between prothrombin time and clotting time of the blood in nineteen consecutive cases observed in March 1940. All clotting times were done by the capillary tube method. This correlation has been constant throughout the entire study. As the prothrombin time rises and falls so does the clotting time.

We have on one previous occasion called attention to an apparent seasonal variation of the incidence of prothrombin deficiency in the newborn. That such a seasonal variation does occur is evident from the facts described in chart 3. The highest prothrombin time encountered in each of 191 consecutive control cases was ascertained and the average prothrombin time for each calendar month is shown in the top curve. The same results in a series of 189 consecutive treated cases are shown in the lower curve. The break in the curves for the months of April and May mark a necessary interruption in the progress of this study. The following facts are evident: 1. Prothrombin deficiency

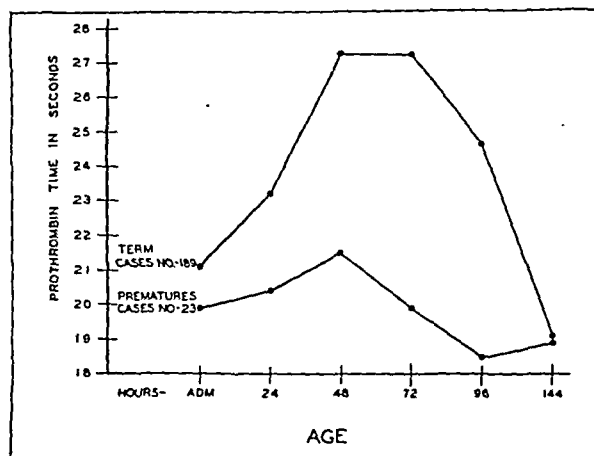


Chart 1.—Average prothrombin time of control cases.

occurred with surprising frequency in the control series. 2. No such deficiency is evident in the treated series. 3. A period of marked prothrombin deficiency in the control cases occurred during the winter months, reach-

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[Footnote 5 continued in next column]

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UNTREATED

CASE 1.—Bleeding from circumcision for three hours. Prothrombin seventy-seven seconds. Clotting time six and one-half minutes.

CASE 2.—Bleeding from clipped tongue frenulum and heel of five hours' duration. Prothrombin seventy-five seconds. Clotting time ten minutes. Controlled in two hours with vitamin K.

CASE 3.—Vomited blood on two occasions. Bleeding from cord and heel puncture for five hours. Prothrombin three and one-half minutes. Controlled with vitamin K in three and one-half hours.

CASE 4.—Bleeding from fontanel and heel punctures of fourteen hours' duration. Paralysis of right side of face and nystagmus developed. Died of intracranial hemorrhage on second day. Cord blood prothrombin one minute forty seconds. On day of death, prothrombin time eleven minutes. Clotting time above fifteen minutes.

CASE 5.—Cephalematoma at birth. Prothrombin time forty seconds at forty-eight hours.

CASE 6.—Bled from heel puncture for two hours. Prothrombin time six minutes. Clotting time nine minutes.

CASE 7.—Premature infant. Died on fourteenth day. An unsuspected intracranial hemorrhage found post mortem. Prothrombin time twenty-six seconds. Clotting time five and one-half minutes.

CASE 8.—Bleeding from scratches on face and puncture wound in heel for four hours. Prothrombin time eight minutes. Clotting time eight minutes. Controlled by vitamin K in two and one-half hours.

CASE 9.—Bleeding from heel puncture for three hours. Prothrombin seventy-two seconds. Clotting time eleven minutes. Controlled with vitamin K.

CASE 10.—Bleeding from heel puncture for nine hours. Prothrombin fifty-five seconds. Clotting time twelve minutes. Controlled with vitamin K.

CASE 11.—Large cephalematoma. Prothrombin at twenty-four hours thirty-five seconds. Clotting time nine minutes.

CASE 12.—Profuse bleeding from clipped tongue frenulum for seven and one-half hours. Epinephrine packs, local epinephrine injections and silver nitrate cauterization tried without success. Prothrombin time sixty-five seconds. Clotting time ten minutes. Controlled with vitamin K in three and one-half hours.

CASE 13.—Bled from circumcision for five hours. Prothrombin thirty-two seconds. Clotting time six and one-half minutes. Controlled with vitamin K in one hour.

CASE 14.—Spontaneous bleeding from mucous membrane of mouth for two hours. Prothrombin forty-eight seconds. Clotting time nine minutes. Controlled with vitamin K in one and one-half hours.

CASE 15.—Six day old child bleeding from cord following trauma. Had bled for twelve hours. Prothrombin time fifty-nine seconds. Clotting time eight minutes. Vitamin K given and in two hours prothrombin was thirty-one seconds and clotting time six minutes. In eight hours clotting time had dropped to three minutes.

CASE 16.—Profuse bleeding from heel puncture wound for seven hours. Prothrombin thirty-five seconds. Clotting time six minutes. Controlled by vitamin K in one hour.

CASE 17.—Bleeding from heel puncture for twelve hours. Prothrombin time seven minutes. Clotting time eleven minutes. Controlled with vitamin K in two hours.

CASE 18.—Profuse bleeding from heel puncture wound for two hours. Prothrombin two and one-half minutes. Clotting time seven minutes. Controlled with vitamin K in two hours.

CASE 19.—Seen on fourth day. Marked respiratory difficulty. Moribund. Signs of fluid in right chest. Died in about thirty minutes after admission. Postmortem examination revealed massive hemorrhage in right pleural cavity. Prothrombin time done immediately after death was three minutes forty seconds.

CASE 20.—Hemorrhagic disease of the newborn. Intracranial hemorrhage with death on eighth day. Clotting time fourteen minutes. No prothrombin time done.

CASE 21.—Bleeding from heel puncture. Clotting time nine minutes. No prothrombin time done.

CASE 22.—Bleeding from cord for twelve hours and also bleeding from heel puncture for several hours. Clotting time eleven minutes. No prothrombin time done. Controlled with vitamin K in two hours.

CASE 23.—Intracranial injury. Patient was slightly lethargic on fifth or sixth day but diagnosis did not become obvious until the seventh day, at which time convulsions appeared. Craniotomy performed showed definite contusion of the right hemisphere. This was a private patient and was not included in the prothrombin studies. Clotting time four minutes and bleeding time one minute on seventh day.

TREATED

CASE 24.—Baby admitted in poor condition after a hard labor. Mother received vitamin K for two weeks before labor. Child developed definite spasticity, had slight convulsions and refused food. The prothrombin time and clotting time on this child were normal throughout hospital stay. On discharge, this child was clinically well. No demonstrable intracranial signs were present.

CASE 25.—Precipitous labor. Moderate sized cephalematoma noted at twenty-four hours. Mother received no vitamin K before delivery. Baby received natural vitamin K concentrate on admission and at end of twenty-four hours. Clotting time on third day was four minutes.

CASE 26.—Moderate amount of bloody vaginal discharge noted on fourth day. This continued for a period of four days. No other abnormal tendencies. Clotting time on admission four minutes and, after forty-eight hours, three and one-half minutes. Mother received synthetic vitamin K intravenously eight hours before delivery. Baby received synthetic vitamin K by mouth on admission and at end of twenty-four and forty-eight hours. No prothrombin deficiency was noted at any time.

CASE 27.—Mother received intravenous vitamin K one hour and seventeen minutes before delivery. Small cephalematoma noted twelve hours after admission. Clotting time on admission three and one-half minutes.

COMMENT

It seems unlikely that hypoprothrombinemia and associated hemorrhage will occur in any newborn infant adequately treated with vitamin K through its mother and supplemented in the first few days of life. Prothrombin deficiency, so commonly present in the first few days of life, is the immediate cause of bleeding in hemorrhagic disease, and prothrombin deficiency is in turn the result of avitaminosis K. The etiology, prevention and treatment of hemorrhagic disease of the newborn would appear to be well established.

The role of hemorrhagic disease as a factor in birth injury has in the past been a matter of some controversy. Most writers on this subject have placed scant emphasis on any inherent tendency of the newborn infant to bleed at the time of delivery and would attribute the varying degrees of intracranial hemorrhage commonly occurring at this time to trauma alone. The laboratory, clinical and statistical data here described would indicate that avitaminosis K and associated prothrombin deficiency may well be a very real factor in many of these cerebral accidents, particularly in those infants in which the signs of intracranial hemorrhage are late in appearing, indicating that the hemorrhage is of a slow oozing character. Although trauma is the precipitating factor, the extent of existing damage may well depend on the degree of prothrombin deficiency. At the present time every infant born in the University of Virginia Hospital is treated with vitamin K through the mother and

this treatment is supplemented by oral administration of vitamin K in the first few days of life. Our experience to date convinces us that hypoprothrombinemia and associated neonatal hemorrhage will not occur in infants so treated and that so-called traumatic birth injury has been and will continue to be materially lessened.

ABSTRACT OF DISCUSSION

DR. CLIFFORD SWEET, Oakland, Calif.: A method of asking parents for autopsies which has proved successful is given each year to the new house officers. In our first approach, my associates and I assure the parents of our sympathy and tell them that we want to offer them one more real service—a complete examination of the body of their child. That we want to spare them the doubts that often assail people for years after the death of a member of the family. That often, even years afterward, people have returned to me and have said through their tears, "Doctor, I wish I had let you do that postmortem examination and then I would really know whether or not his death could have been prevented." That some disease may be found in the body which should be discovered for the sake of other members of the family, for example, miliary tuberculosis. Since we have placed first emphasis on the value to the family of the postmortem at the Children's Hospital in Oakland, where at least half of our patients are cared for as private patients, the autopsy percentage has remained for years about 80 and has at times risen to 90. Postmortem examinations are especially important on the bodies of newborn infants. By no other means can the real cause of death be determined and the family be assured that no condition is present which might affect the welfare of future infants born to them. In addition, the family can be spared the distress which so often ensues from their mistaken idea that they lost their child because of faulty obstetrics, as for example the infant with all the signs of a birth injury who at postmortem was found to have a cerebellar abscess of intra-uterine origin and a recently observed absence of muscle tissue in the diaphragm incompatible with more than a few weeks of life. I congratulate the authors on this work and on their modesty in drawing conclusions. I shall go home and make use of their excellent teaching.

DR. CHESTER BROWN, Arlington, N. J.: I should like to ask the authors to give the exact details of the administration of vitamin K to newborn infants. Do they add bile salts and, if so, in what amount and by what method?

DR. W. W. WADDELL JR., Charlottesville, Va.: With regard to Dr. Brown's question as to the details of the administration of vitamin K, the following procedure has been found quite adequate: Five-tenths cc. of natural vitamin K concentrate or its equivalent in the form of 2-methyl-1, 4-naphthoquinone administered immediately after birth and at the end of twenty-four and forty-eight hours will adequately prevent prothrombin deficiency in the newborn. One cc. of natural vitamin K concentrate or its equivalent in the form of 2-methyl-1, 4-naphthoquinone administered daily to the mother in the last ten days of pregnancy will prevent prothrombin deficiency in the offspring. We have never seen a single infant treated in either of these fashions which developed prothrombin deficiency. At the present time we are using synthetic products exclusively and believe that when they come on the market they will be the preparations of choice. They can be procured at a much lower price.

Common Sense.—Three fifths of the practice of medicine depends on common sense, a knowledge of people and of human reactions. More than half of the remainder is technological and mechanical, the work of those medically trained artisans we call surgeons. What remains may be termed preventive; and this in bulk very properly and inevitably comes to be taken over by the state, though people, being what they are, find ways of evading a disagreeable statute as in the case of compulsory vaccination—intended for others but not themselves. Not everybody obeys the traffic light, and every regulation breeds its jay-walkers and its racketeers.—Cushing, Harvey: *The Medical Career and Other Papers*, Boston, Little Brown & Co., 1940.

CLIMATE AND MILITARY PREPAREDNESS

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LONG BEACH, N. Y.

Any plan for military preparedness based on a defense of this hemisphere would be incomplete without proper consideration for the role of climatic factors in American warfare. Adherence to the Monroe Doctrine may necessitate the sudden dispatch of troop units with considerable striking power sufficient to prevent invasion or to break enemy footholds in any part of the Americas. Extending from one arctic region to the other, the Americas present all types of climate and all varieties of climatic change. Diseases caused by abrupt climatic change or by prolonged exposure are manifold and constitute important problems of preventive medicine in warfare. Troop movements, therefore, must always carefully take into account the degree of climatic change involved lest the efficiency of the fighting force be considerably, even dangerously, impaired. It is my purpose in this paper to outline the principal factors of this important problem and to present a basic and practicable plan for its solution.

By "climate" I mean the sum total of meteorologic phenomena that characterize the average state of the atmosphere at any given locality. "Weather" is only a phase—a single act—of this succession of phenomena. Climate is a long range view on weather.

Out of the complexity of coeffective factors in climate one may separate temperature, humidity, winds, barometric pressure and sunshine duration as the most important in relation to human life. These are the factors which determine the heat absorbing capacity of the atmosphere, which means the rate of heat absorption from any given body surface with a given temperature expressed in calory/square inch/minutes. This heat absorbing capacity of the atmosphere is proportionate to the difference between the temperatures of the body surface and of the atmosphere; it is influenced by humidity and by barometric pressure and it increases with the square root of wind velocity.

HUMAN COMFORT

The individual feels comfortable when his heat production is in equilibrium with the heat absorbing capacity of the environment. Every person has a characteristic comfort zone. When this heat equilibrium is upset so that either chilling or perspiration results, the limits of the comfort zone have been exceeded. The limits of the individual comfort zone depend on, and fluctuate with, seasons, time spent indoors and outdoors, clothing, activity, age, sex and constitution. Outside the comfort zone the human organism is confronted with various problems. If the heat absorbing capacity of the environment diminishes, heat loss is accomplished by vasodilatation in the skin and perspiration; heat production is diminished by lower muscular tone and lowered basal metabolic rate. In a cold environment (increased heat absorbing capacity) heat preservation is the problem. This is performed by vasoconstriction of the cutaneous blood vessels, increased muscular tone and a higher basal metabolic rate. In a change of season the heat absorbing capacity of the environment changes more or less gradually. Thus, going from fall to winter, the heat absorbing capacity increases. This gradual change extends the lower limits of the comfort zone, so that

indoors one is comfortable at a temperature five or six degrees Fahrenheit lower than the same room in summer. A corresponding elevation of the upper limit of the comfort zone occurs during the gradual change from spring to summer. No hardship is imposed on the organism in adjusting to such a slow change. In a sudden change, however, such as rapid movement of troops from temperate to subarctic regions, the necessity for quick adaptation is forced on the body. This requires maintained vasoconstriction and a sharp rise in the basal metabolic rate, which, if prolonged, may produce deleterious effects. Prolonged and repeated nasal vasoconstrictions lower the resistance of the mucous membrane, a faulty reflex which may be an important factor in the causation of infections of the upper respiratory tract. The importance of respira-

changes in the external environment, while the use of clothing and heating constitutes an indirect defense. The average American, following the instinct to seek comfortable temperature levels, has a limited comfort zone as a result of clothing and indoor heating—a reliance on indirect defense. A systematic extension of the comfort zone by direct methods of hardening American troops, especially those who may face the rigors of arctic warfare, is imperative for full fighting efficiency.

It is not sufficient to adapt soldiers to sudden climatic changes alone. They must be able to endure prolonged climatic exposures associated with physical strain. This is the real measure of the stamina of the individual. There is a limit of endurance, which may be called "peak performance," the level of which can be raised by training. The example of lack of stamina with good climatic adaptation is provided by the Russian soldiers in the recent war in Finland. The divisions annihilated north of Lake Ladoga were healthy, hardy young Russians, well clothed for action in such climates and trained in the Russian steam baths to endure sudden changes in temperature. However, they were not able to withstand the rigors of prolonged exposure to the Nordic winter of Finland. Fundamentally, these were instances

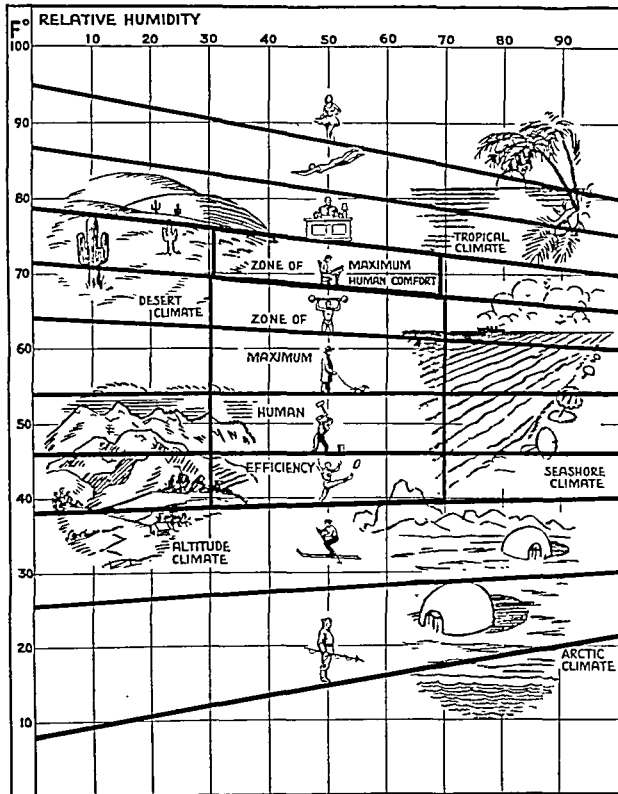


Fig. 1.—Illustrated climatogram, showing all possible combinations of humidity and temperature and zones of maximum human comfort and efficiency. Lines of effective temperature connecting points of equal human comfort comprising different combinations of temperature and humidity (heavy lines). Adapted to environment by exposure, clothing and activity, man feels comfortable along extremely differing lines of effective temperature.

tory diseases in relation to fighting efficiency of troop personnel is self evident. This was much less a factor in the old style of trench warfare—the war of position—than in the modern tactical maneuvers involving rapid movements of troops over great distances. In trench warfare soldiers with acute respiratory diseases were kept at a short distance in the rear, were considered as reserves and were returned to the front line in from seven to ten days. In a war of movement they are completely lost as effectives.

HARDENING

By means of planned, gradual, repeated exposures, the limits of the individual comfort zone may be expanded—a process known as hardening. Through the hardening process the system acquires a direct defense mechanism against sudden and marked

Comparative Morbidity Among Fresh and Seasoned Troops

	Company A, City to Tyrol, 248 Men, Number of Cases	Company B, Russia to Tyrol, 242 Men, Number of Cases
Common cold (without fever).....	32	10
Tonsillitis	12	4
Influenza	28	7
Pneumonia (lobar)	8	2
Appendicitis	3	0
Rheumatic fever (acute).....	3	1
Fibrositis	12	4
Total morbidity	98—39.5%	28—11.5%

The low morbidity rate among the troops hardened in Russia speaks for itself on the value of conditioning.

of units pitted against one another in a test of endurance requiring peak performance, and the Russians failed.

In the recent Norwegian campaign the French sent troop units of the Foreign Legion into action. These men were trained in a desert climate with extreme variations of temperature, both high and low, combined with low humidity. The fluctuations of temperature in desert climates are due to a loss of heat through radiation at night. This is gradual, and one blanket at night is sufficient to compensate in protecting a soldier from this change. In Norway, with its predominantly low temperatures, high wind velocity and high humidity, a climatic adaptation too great to be made suddenly was imposed on the legionnaires. This further illustrates poor judgment in a warfare requiring climatic changes. The dispatch of French Alpine Chasseurs was indicated in this case. In the rout of the English at Steinkjer, clothing inadequate for northern Norway was a contributing factor.

Abrupt climatic change may bring to the fore latent diseases such as tuberculosis, arthritis, heart disease and respiratory infections. Not only may latent diseases come forth but general resistance to acute infections tends to be lowered. For example, during the first world war I was detailed as a medical officer with two companies of infantry to clear up the high mountain road on the side of the Becco di Filla Donna mountain in the Austrian Tyrol, which was buried under an avalanche of snow. The time was March 1916, the

altitude was 14,000 feet. We started from the Adige valley with an average temperature of 60 F. to reach a wind swept site the average temperature of which ranged from 30 to 35 F.

Company A had been stationed in the valley for about six weeks and was composed of raw recruits from cities. Company B had arrived ten days previously after an all winter campaign through Russian Poland—a company of seasoned, hardened fighters. It took us three days to accomplish our task, working in the snow, wind and rain twelve hours a day, and sleeping in the primitive deserted stone huts of mountain shepherds. In a five day period, beginning with the first day of our assignment, the list of comparative morbidity was as shown in the accompanying table.

From this one may conclude that the ideal of physical fitness in the soldier of war should include:

1. Ready adaptability to sudden and extreme climatic change.
2. Ability to endure prolonged exposure to extreme change.
3. Maintenance of peak military efficiency in either or both of the aforementioned instances.

SUGGESTIONS FOR THE UNITED STATES ARMY

1. The training of recruits should start in the fall of the year. The gradual change to winter affords a parallel to gradual hardening by progressive exposure. These series of exposures to a climate growing increasingly rigorous is the best method for obtaining climatic adaptability whenever possible. Recruits starting next April under the present conscription plan will require at least ten months to obtain the adaptability acquired by the October group in five months.

2. The entire system of training troops has been based on summer maneuvers in the North and winter maneuvers in the South. In my opinion this procedure should be completely reversed to provide troops trained for both extremes—subarctic rigor and tropical mugginess.

3. Climatic adaptability can be furthered in training by frequently repeated hydrotherapy. The procedures to be recommended are (a) surf or river bathing wherever possible, (b) cool and gradually cooled showers as a part of the daily routine and (c) Scotch douche apparatus with alternating hot and cold streams of water. Those hydrotherapeutic processes are especially useful in the hardening of soldiers with poor climatic adaptability and in increasing self confidence and military morale—a very important military consideration.

4. A low average temperature of winter barracks, not exceeding 65 F., is recommended in training. Observations over several years show that the number of colds in apartment houses increase with a rise of indoor temperature above 70 F.

5. Parallel with this suggestion (lowering the temperature of the barracks), studies should be made on the vestimental climate of the soldier by frigorimetric methods, with different clothing materials and large series of cutaneous temperature readings under these materials. The clothing of the new United States Army will thus be based on scientific selection with due consideration for the climatic requirements of the region in which it is to be used.

6. Individual climatic endurance charts are recommended as aids in determining the adaptability of the soldier of whom special duties may be required. These charts should include:

- (a) Line of chilling at different humidities.
- (b) Line of perspiration at different humidities.

(c) Basal metabolic rate in both regions.

(d) Behavior of skin and rectal temperatures in planned exposure:

(1) Convergence of cutaneous and rectal temperatures after a short exposure shows faulty heat regulation: domestication.

(2) Divergence of cutaneous and rectal temperatures (rectal temperature increased, cutaneous temperature drops) after exposure indicates acclimatization.

(c) Ice cube test for thermic reacting ability of the skin:

(1) Delayed local hyperemia appearing later than ten seconds after two seconds contact with an ice cube indicates poor thermic reacting ability of the skin.

(f) Erben's test for determining autonomous nerve balance:

A positive Erben's test is a slowing down of the pulse rate by more than ten beats per minute after forced forward bending. It shows vasomotor instability, noted usually in vagotonic individuals. Persons with a positive Erben's reaction are poor risks in climatic exposure unless hardened.

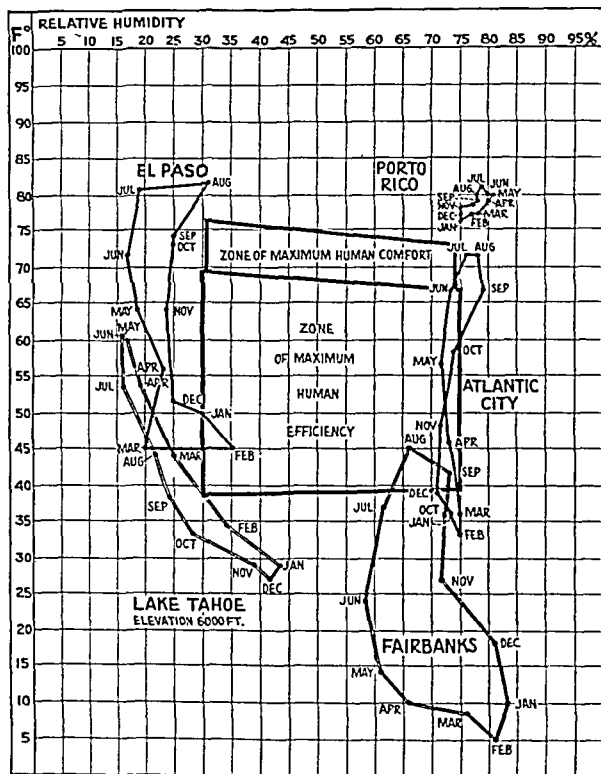


Fig. 2.—Comparative climatogram. The climatogram, which covers all possible combinations of temperature in degrees Fahrenheit and relative humidity (per cent saturation), has projected on it the zone of maximum human comfort and the zone of maximum human efficiency. Silhouetted against these zones are the monthly temperature and humidity averages of different localities representative of different climatic types. Characteristics of climate types represented are:

Puerto Rico, tropical: negligible fluctuation of a high temperature level, high humidity, lack of winds; enervating debilitating climate.

Fairbanks, Alaska, arctic: moderate fluctuation of an extremely low temperature level, high humidity; exhausting climate.

Lake Tahoe, Nevada, high altitude: extreme diurnal and seasonal range of temperature, low humidity, low barometric pressure, low oxygen content, high ultraviolet quality in solar radiation; stimulating climate.

El Paso, Texas, desert: extensive diurnal and moderate seasonal range of temperature, extremely low humidity, abundant sunshine; moderately stimulating climate.

Atlantic City, seashore: moderate diurnal, marked seasonal changes in temperature, high relative humidity, vigorous sea breezes; stimulating climate.

(g) Changes in blood chemistry: Completed acclimatization is noted by definite characteristic changes in the blood chemistry involving a change in the levels of phosphorus, calcium, sugar, carbon dioxide combining power and cholesterol.

(h) The modified Muck test: This will discover endocrine imbalance by showing inability of maintaining the blanching of the nasal mucous membrane following topical application of epinephrine. After complete acclimatization (increasing the sympathetic tonus) the vasoconstriction in the nasal mucosa

is maintained beyond fifteen minutes and blunt irritation of the blanched area causes a characteristic elevated white streak reaction.

7. Artificially controlled climatic testing laboratories for some of the foregoing tests may be readily reproduced with modern air conditioning apparatus. It will therefore be possible to select men for special tasks from among those who can adapt most quickly to changes in environment as observed in artificially controlled test rooms. Thus a yardstick on which to base the training of others will also be provided. Seven million dollars has been appropriated for an army aviation test station at Fairbanks, Alaska, to be ready in November, to study the behavior of airplane motors in arctic climates. This is a very necessary establishment, yet little provision has been made for testing the climatic adaptability of the most important military machine—the human body. Such tests should be conducted both at rest and during varying degrees of activity in different clothing.

8. As previously stated, the Western Hemisphere includes every type of climate and every type of geological milieu. If the possibility exists that troops may have to be sent to any of these sites, a larger body of troops especially trained for the climate must be organized. This applies at present more to troops needed in subarctic zones than to those for tropical use. Other acute needs envisage desert and mountain (high altitude) troops. For a clearer understanding of climatic problems, a climatogram is presented.

9. The climatogram is a graph prepared to compare climates of different places in the United States as expressed in monthly temperature and humidity averages. Superimposed are the zones of maximum human efficiency, both mental and physical, and the zone of maximum human comfort. Also shown are lines of effective temperature depicting equivalents of human comfort at varying temperatures and humidity. This means that a person is as comfortable at 84 F. and 40 per cent humidity as at 88 F. and 80 per cent humidity with an 8 mile breeze blowing, other conditions being equal. The limits of the zone of comfort of any person are given as perspiration at one end and chilling at the other. The process of hardening extends the comfort zone in the direction of chilling as an expression of increased adaptability.

In warfare the climatogram is useful in that it shows graphically the extent of a climatic change involved in a required military maneuver.

It also shows the relations of climate of the new environment with zones of maximum human efficiency and comfort. From the military point of view relativity in human reaction to climatic change is most important. The climate of the site of previous training in relation to the climate of the proposed site will greatly influence the adaptability and the efficiency of the troops. For example, in winter in the temperate zone greater efficiency may be expected of troops trained in subarctic regions as compared with troops trained in subtropical environments.

10. The present climatic health resorts and spas can be used if needed for the rehabilitation of convalescents. Most of these resorts are located in salubrious climates. A climate void of extremes, sedative in character, is especially recommended for convalescents. The employments of all types of natural resources and facilities of the resorts can be best accomplished by medical men well acquainted with them.

11. Each climate has its optimal diet. It should be used as far as possible to enhance adaptation. A high fat, high protein, high calory diet is advisable in cold climates. A high carbohydrate, low fat and protein, low calory diet is advisable in tropical climates. Owing to a lack of fresh vegetables and fruits in cold climates there is a lack of minerals and vitamins in Nordic diets. Tropical soils are poor in minerals and rich in humic acid and fruits and vegetables are plentiful but are poor in minerals. Loss of mineral salts through perspiration is an additional factor. Hence the administration of concentrated mineral and vitamin pills are advisable in extreme climates, both arctic and tropical.

12. Creation of a special climatic advisory board comprising meteorologists, physicians, physiologists, physiochemists, chemists and biochemists is advised. Their function should be:

- (a) Further study of climatic factors in warfare.
- (b) Establishment of standards of training by evaluation of results of training in climatic relationship.
- (c) To act in a consultant capacity in troop movements.
- (d) To set the standards for distribution of convalescents to proper climatic milieus.

STERILITY IN THE MALE

DIAGNOSIS AND TREATMENT

HENRY A. R. KREUTZMANN, M.D.

SAN FRANCISCO

Sterility in the male is an exceedingly complex subject entailing exhaustive urologic, endocrinologic and laboratory studies. For the purpose of simplification, all cases can be divided into two groups, urologic and endocrinologic. Occasionally malnutrition or vitamin deficiency may cause sterility, but it occurs so infrequently that for practical purposes it need not be stressed. The paper is limited to the study of sterility as it affects the human being, as the result of current animal experimentations are not analogous to those found in man.

The urologic cases are classed as either congenital or acquired, depending on the etiology. The most frequent congenital causes of sterility are hypospadias, cryptorchism and abnormal attachment of the epididymis to the testicle. The majority of acquired cases are the result of a former gonorrheal infection resulting in bilateral epididymitis, stenosis of the ejaculatory ducts, seminal vesiculitis, vasitis and urethral stricture.

The endocrinologic cases are due to atrophy of the testicles, pituitary dysfunction and hypothyroidism.

The study of sterility must include a complete history and examination of the genito-urinary tract. In the history, the following questions should be stressed: Age at puberty, number of years married, any children by previous marriage, contraceptives used, type or method and how long; mumps, age and complications; syphilis; gonorrhea, duration, complications; operations on genito-urinary tract; injuries to genital tract; urologic symptoms; sex life.

In the physical examination the penis should be examined for hypospadias or scars; the urethra for stenosis of the meatus, discharge or stricture; the testes for cryptorchism, atrophy, nodules on the epididymides or thickening of the vas deferens; rectal palpation to

determine the size and consistency of the prostate and the condition of the seminal vesicles. The examination should also include a basal metabolism test.

UROLOGIC ASPECTS

Aspermia is due either to atrophy of the testes or to an inflammatory occlusion situated somewhere between the globus major and the ejaculatory ducts. When the testicles are normal, one can be certain that the lack of sperm is due to obstruction. It is then important to establish the exact point where it occurs so that the proper treatment may be given to overcome the obstruction.

Stenosis of the ejaculatory ducts can be determined by the failure of the seminal vesicles to empty after massage and the absence of seminal fluid in the expressed secretion. The patient also gives a history of pain or burning sensation in the perineum or rectum at the moment of ejaculation and in some cases for several hours afterward. The treatment is to dilate the ducts with bougies passed through a urethroscope.

To determine the patency of the vas, I inject solutions into the lumen through small incisions made in the scrotum. For injection material 5 per cent mild protein silver is used on one side and 2 per cent mercurochrome on the other. Before the injections are made, a urethral catheter is inserted into the bladder. When both vasa are patent, the solutions appear immediately from the outer end of the catheter. If one solution does not appear, one knows definitely which side is blocked. I have attempted to relieve the obstruction in the vas by passing fine probes or forcibly injecting solutions into the lumen, but with only occasional success. One is handicapped by the fact that this is an operative procedure and repeated attempts cannot be made as in the case of a urethral stricture.

When both vasa and ejaculatory ducts are patent, the absence of sperm is due to an obstruction in the epididymides. In these cases the most successful treatment is Hagner's method of anastomosing the vas deferens to the efferent ducts of the globus major, thereby sidetracking the epididymis.

Chronic seminal vesiculitis can produce a depressant action on sperm, reducing their motility to such a degree as to prevent conception. Long continued massage and heat will remedy this condition.

In hypospadias, even though the slit is small, the improper deposition of the secretion may prevent pregnancy. The simplest method of overcoming this condition is for the patient to have intercourse wearing a condom with a small opening at the end.

A severe urethral stricture may prevent conception by preventing sufficient sperm being deposited in the vagina. Chronic prostatitis is not a cause of sterility, as I have examined men with families in whom the prostatic secretion was loaded with pus cells.

Cryptorchism can be corrected either with glandular therapy or with the Keetley-Torek operation. Treatment should not be delayed after puberty as it is now known that, the longer correction is withheld, the greater is the destruction of the spermatogenic function of the testicle.

ENDOCRINOLOGIC FACTORS

If the urologic examination is negative, one can correctly assume that some endocrine dysfunction is present. This supposition can be proved by an examination of the sperm. In a study of the ejaculate the three most important factors are (1) the number of

sperm per cubic centimeter, (2) the percentage of abnormal forms and (3) the degree of motility.

The work of Hotchkiss¹ has shown that the previous concept of man being sterile if the sperm count is below 60,000,000 per cubic centimeter is incorrect. In his work on 200 men whose wives were pregnant, Hotchkiss found counts as low as 2,250,000 per cubic centimeter and in 25 per cent of the men the count was below 60,000,000.

Moench² states that the number of abnormal sperm should not exceed from 19 to 20 per cent. He assumes that fertility is impaired when abnormalities reach from 20 to 22 per cent and that clinical sterility is usually present if more than 25 per cent abnormal forms are found.

In a series of forty-eight men whom I was able to follow over a period of years, 35 per cent had less than 20 per cent abnormal sperm and pregnancy occurred in every case without any treatment, bearing out Moench's conclusions. All of the patients showing abnormalities of the ejaculate can be classified into four groups.

1. Normal sperm count and normal percentage of abnormal forms with a lowered basal metabolic rate.
2. Oligospermia and a normal percentage of healthy sperm.
3. Normal number of sperm with an increase of abnormal forms.
4. Oligospermia with an increase of abnormal forms.

Fifteen per cent of the patients were in group 1, having a basal metabolic rate varying from minus 10 to 18. They were all given thyroid by mouth, following which the desired results were obtained.

Patient S. was most instructive. He was entirely normal except for a metabolic rate of minus 16 when first seen in 1934. Chorionic gonadotropin was given

Abnormal Forms After Twelve Injections of 5 Mg. of Testosterone Propionate

	Before Treatment	After Treatment
Case 1.....	24%	19%
Case 2.....	14%	17%
Case 3.....	18%	17%
Case 4.....	31%	31%
Case 5.....	27%	33%
Case 6.....	28%	50%

for four months with no result. Thyroid was then administered continuously, and in November 1935 his wife became pregnant. For the next three years thyroid was discontinued. He returned in June 1938, as they were anxious to have another child and his wife had not become pregnant again. Thyroid was again administered and three months later she became pregnant.

It is in groups 2, 3 and 4 that occasional brilliant results, but mostly failures, are reported after the administration of endocrine products (Heckel,³ Hotchkiss,⁴ Browne,⁵ Rubinstein and Kurland⁶).

1. Hotchkiss, R. S.; Brunner, E. K., and Grenley, Philip: Semen Analyses of 200 Fertile Men, *Am. J. M. Sc.* **106**: 362-384 (Sept.) 1938.

2. Moench, G. L., and Holt, Helen: Sperm Morphology in Relation to Fertility, *Am. J. Obst. & Gynec.* **22**: 199 (Aug.) 1931.

3. Heckel, N. J.: The Gonadotropic and the Gonadotropic-like Factor in the Treatment of Male Sterility, *Endocrinology* **22**: 111-114 (Jan.) 1938.

4. Hotchkiss, R. S.: Methods in Sperm Analyses and Evaluation of Therapeutic Procedures, *J. A. M. A.* **107**: 1849-1851 (Dec. 5) 1936.

5. Browne, O'Donel: Hormonal Treatment of Male Sterility, *Irish J. M. Sc.* **6**: 618-621 (Aug.) 1939.

6. Rubinstein, H. S., and Kurland, A. A.: Effect of Testosterone Propionate on Spermatogenesis in Human, *South. M. J.* **32**: 499-503 (May) 1939.

Little is known about the endocrine changes that cause sperm to become abnormal in men who are apparently healthy and show no glandular disturbances. Therefore the administration of endocrine products at the present time is entirely experimental and will continue to be so until the glandular dyscrasias which cause changes in the sperm are known for certain.

It is impossible to explain why a group of men each receiving the same androgen or gonadogen for the same condition, as for example oligospermia, should react differently. In some instances there will be an increase in the number of sperm, whereas in others there will be no change. Marked increase in the number of abnormal forms may also occur in one man while a decrease will result in another. The only consistently good results of glandular therapy at this time occur in those cases in which the thyroid function is deficient.

In the zeal to treat sterility, one must guard against the inclination to use large doses of androgens, estrogens and gonadotropic agents or to administer them continuously for long periods. I have seen aspermia develop in a patient with 34 per cent abnormal forms after receiving 0.5 cc. of chorionic gonadotropin three times weekly for two months. Examination of the same patient one year later showed only a few sperm present with 25 per cent abnormal forms.

Another patient with 26 per cent abnormal forms received 2 cc. of pregnant mare's serum three times a week for one month. Following the injections the abnormal forms increased to 74 per cent. After a rest period of one month they dropped to 31 per cent.

At the present time testosterone propionate is the androgen most frequently used by physicians in the treatment of both impotence and sterility. Heckel⁷ and McCullagh and McGurl⁸ have shown that this drug when used in doses of from 25 to 50 mg. caused a decided decrease in the number of spermatozoa. However, according to the observations of Rubinstein and Kurland⁶ the administration of small doses of testosterone, 5 mg. three times a week, caused an increase in the number of sperm.

Encouraged by their results, I studied the effect of small doses of testosterone propionate on the abnormal sperm of six patients. In three men the percentage was within normal limits and in the other three there was a pathologic increase in the abnormal forms. Testosterone propionate was injected three times weekly in 5 mg. doses for one month. As can be seen from the table, there was no consistent change after the administration of the drug. In two patients with an increased number of abnormal sperm before treatment the drug caused a further increase in pathologic cells, while in the third patient there was no change.

In view of the harm that may occur, the indiscriminate injection of endocrine products should be stopped. One should be especially cautious in the use of large doses over long periods of time as the pathologic changes in the sperm may be increased by such treatment.

It is advisable to make repeated sperm analyses during the administration of these potent drugs in order to guard against transient or possible permanent damage to the spermatogenic structures of the individual.

SUMMARY AND CONCLUSIONS

All cases of male sterility can be divided into two groups, urologic and endocrinologic. The urologic cases are either congenital or acquired.

Studies of patients should include a complete urologic history, examination of the genital tract and of the ejaculate, and a basal metabolism test.

The endocrine treatment is at present in the experimental stage. Results cannot be attained in all cases until the glandular dysfunctions which cause sterility are known.

At present, it is only in cases of hypothyroidism that consistently good results are obtained.

The administration of large doses of testosterone propionate causes marked decrease in the number of spermatozoa per cubic centimeter. The injection of 5 mg. of testosterone propionate three times a week for one month caused no appreciable change in the percentage of abnormal forms in patients with both normal and abnormal sperm counts.

Caution should be exercised in the administration of large doses of endocrine products over long periods of time.

Repeated sperm analyses should be made during treatment to guard against transient or possible permanent damage to the spermatogenic structures of the individual.

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THE NATURE OF HUMAN INFERTILITY

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AND

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The average couple seeking relief from sterility in the year 1920 had about a 20 per cent chance of accomplishing their desire if they were fortunately able to consult one of the half dozen physicians in this country who were at that time devoting particular attention to the subject. In the hands of other doctors, including eminent gynecologists and urologists, the likelihood of success was only half as great. Today there are many groups of expert workers whose percentage of cures ranges from 40 to 50. It would seem that the profession has some right to congratulate itself on this striking improvement in the management of a problem which is vitally important in the lives of more than 2,000,000 American homes and consequently, in the aggregate, of no small importance to the social and economic welfare of the nation.

Huhner's method of postcoital examination and the Rubin test of tubal patency initiated a long series of technical advances, among which may be mentioned more precise and critical evaluation of the semen, better approaches to the assay of endocrine functions, and the use of both endometrial and testicular biopsies. Indeed, investigation and the interpretation of observations have now progressed to a point at which little of a factual nature needs to remain obscure in the physical status

7. Heckel, N. J.: Production of Oligospermia in Man by Use of Testosterone Propionate, *Proc. Soc. Exper. Biol. & Med.* **40**: 658 (April) 1939.

8. McCullagh, E. P., and McGurl, F. J.: Effects of Testosterone Propionate on Epiphyseal Closure, Sodium and Chloride Balance and on Sperm Counts, *Endocrinology* **26**: 377-384 (March) 1940.

Read before the Section on Urology at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.
The conclusions reported in this paper are based in large part on an organized group study of sterility, initiated in 1927 at the Evans Memorial for Clinical Research and Preventive Medicine, a unit of the Massachusetts Memorial Hospitals.

of a childless couple, excepting only the question of whether or not mature ovulation occurs. There still exists, however, a considerable misconception of those basic principles which underlie a reproductive failure on the part of two apparently healthy individuals, principles which must be understood if investigation and treatment are to be carried out intelligently. At the risk of repeating certain ideas previously voiced by us and other workers, we propose in this paper to consider some of the fundamental details of the nature of infertility.

During the past thirteen years it has been our privilege to carry out the investigation of childless marriages as a group endeavor. Experience has confirmed certain theories on the causation of sterility which were responsible for the establishment of the group and has afforded information of great utility in the selection of proper therapy. Results have amply justified the routine use of diagnostic procedures which in some cases were perhaps unnecessarily elaborate and at times inconvenient. Although the members of the section to which this communication is addressed are particularly concerned with the urologic aspects of the subject, it should again be emphasized here that only by a thorough inquiry into the condition, constitutional as well as genital, of both husband and wife can improvement in the percentage of successful results be expected.

The distribution of responsibility between husbands and wives can be appreciated only when one takes into account the important principle of multiple causation. In a minority of cases, perhaps 30 per cent, there exists some condition which alone and by itself is sufficient to make conception impossible. Such absolute factors of sterility would be exemplified by atrophy of the testes and by occlusion of the genital passages of either sex. The majority of cases present multiple abnormalities, generally of lesser grade. One or two of these might be overcome by nature, but several of them acting together lower the combined fertility of the couple to a point inconsistent with the production of offspring. Important factors of this type are certain constitutional faults which because of their subclinical character, often give little hint of their presence. With regard to this group of conditions it is not easy to reach precise conclusions as to cause and effect, since many instances of such abnormalities are found in ordinarily fertile individuals. But the persistent appearance of a given pathologic condition among the faults discovered in the examination of sterile couples at least raises the suspicion that it is significant as a possible causative factor; and this supposition gains support when correction of the condition in question is repeatedly followed by an objectively demonstrable improvement in fertility.

Of interest in this connection are statistics obtained during recent years from couples subjected to that complete group study which we believe necessary for the best interests of patients. In a consecutive series of 200 cases, all without exception showed at least two conditions capable of exerting a depressing effect on fertility. One case presented nine such factors, and three cases eight factors each. The average incidence was 4.8 factors per case. Many of these abnormalities were, of course, entirely unsuspected prior to the investigation, since they had no evident effect on the general health. It should be noted that the rule of multiple causation holds true even in absolute sterility; sixty-

nine such cases occurred in this series, and every one of them presented secondary factors of infertility in addition to a principal cause.

The concept of sterility as a matter of divided responsibility, rather than as a fault ascribable entirely to one or the other partner, has been abundantly emphasized in the literature. Nevertheless its truth is still too seldom recognized in practice. Although the days have happily disappeared when the wife was regularly subjected to dilation and curettage as the first step in the management of a sterility problem, the husband's semen being examined only as a last resort and then only casually, there still exists an unfortunate tendency to treat the first discovered abnormality in each case on the unwarranted assumption that no other faults are present. Thus time is fruitlessly wasted, whereas a more adequate survey, taking both partners into account, might have led to success. The fact is that, in 90 per cent of childless couples seeking the help of the physician, some evidence of infertility can be demonstrated in both members of the pair.

Numerous estimates have been offered on the comparative importance of sterility in the male and in the female. These vary remarkably, depending on the approach to the problem and the experience of the individual author. From ancient times, most of the blame for childless unions has been assigned to the wife. One writer, on the other hand, has indicted the husband in 100 per cent of cases, on the grounds that all sterility is due to gonorrhea and that all gonorrhea is the fault of the male. The quantitative data at present available on the question of divided responsibility allow only approximate conclusions. Our own experience indicates that, of all demonstrable abnormalities known to militate against fertility, some 30 per cent occur on the male side. The statement just made expresses the numerical division of factors between the sexes, and nothing more. It should not be interpreted as asserting that the male is responsible, either wholly or chiefly, for 30 per cent of barren marriages. While it is true that around 90 per cent of the husbands in our cases have proved to be more or less infertile and that some 40 per cent of them show notable deficiencies, one still cannot say to what degree any given man is to blame for the sterility of his particular mating unless one takes into account also the reproductive capacity of his partner. A recent tabulation made by us on this basis gives, in summary, the following results: Out of 100 cases the male was entirely at fault in eight and the female in fourteen. In the remaining seventy-eight cases the responsibility was divided, being chiefly male in twelve cases, equal in fifty-one and chiefly female in fifteen.

These figures seem to offer a rare opportunity and a definite challenge to urologists, who as a group have devoted comparatively little interest to problems of human reproduction. When one considers, however, that more than 12 per cent of all marriages are involuntarily childless and that 30 per cent of the pathologic conditions underlying this state of affairs occur on the male side, it seems evident that the matter of infertility in men is worthy of the serious attention of the urologic profession. Increasing recognition of the importance of male responsibility has already proved to be one of the outstanding advances of recent years in the field of sterility research and practice.

It has also come to be recognized that constitutional causes of infertility, significant enough in both sexes,

have in the male an aggregate importance far greater than that of local abnormalities of the genital organs. This fact in no wise lessens the need for the expert services of the urologist, since in the last analysis it is he who must correlate all data on the male partner, make a diagnosis, direct treatment and determine progress. As a matter of routine he identifies, and treats as indicated, disorders falling within his major field. Those most serious with relation to sterility, notably atrophy of the testis and occlusion of the epididymis or vas, have showed a comparatively small incidence among our cases. Other derangements, such as varicocele, chronic prostatovesiculitis and stricture, are of more frequent occurrence but of much less importance as causative factors of impaired fertility.

In a large majority of cases of male deficiency the principal trouble is the depressing effect on the spermatogenic function exerted by one or another type of constitutional disturbance. No other interpretation suffices to explain abnormal morphology of the spermatozoa, a condition now well understood to be a direct evidence of infertility. Among constitutional faults of the sort in question, those most frequently encountered are endocrine disorders, chronic intoxications from infectious or other sources, and poor hygiene in the matters of diet and exercise.

Normal spermatogenic function depends on two processes: hormonal stimulation provided by one or more fractions of the product of the anterior pituitary lobe, and response to that stimulus on the part of the tubular epithelium of the testis. It appears that constitutional disorders can decrease fertility by interfering with either of these processes: in other words, by inducing a state of anterior pituitary insufficiency or by diminishing the reactivity of the germinal epithelium. In any case the degree of malfunction produced will vary not only according to the severity of the depressing influence but also according to the inherent strength of the sex cells. Thus it happens that a given constitutional fault may render one man sterile while it has no appreciable effect on the reproductive capacity of another. Thus also are explained wide differences in the benefits obtained by treatment of apparently similar cases. Moreover, the permanence of the harm done is determined by the age at which the causative factor becomes operative. Pituitary failure at puberty is likely to result in testicular hypoplasia, and although the endocrine balance may later stabilize itself there will remain a stigma which can never be removed once the growth impulse is dead. The same endocrine disturbance appearing in adult years leads simply to functional underactivity of an organ normally developed, a disorder often amenable to treatment.

Although anterior pituitary insufficiency is the commonest among endocrine factors of subnormal spermatogenesis, the routine administration of gonadotropic substances should be condemned. Accurate diagnosis is prerequisite to proper treatment, since there are many conditions, endocrine and other, that may produce the same subnormality. The hypothyroid cases, which are fairly numerous, form an interesting group. Often these patients present none of the classic signs or symptoms of myxedema; a diagnosis can be made only on the basis of the metabolic rate and other laboratory measurements. The semen in general is good, except for a slight increase in the incidence of abnormal morphology. In other words, the fundamental trouble in such a case

is so little evident that it would rarely be discovered without complete diagnostic study. But successes following thyroid treatment are now numerous enough to remove all doubt about the cause and effect relationship of that trouble to infertility. As regards the internal secretion of the testis, at present too little is known to warrant dogmatic pronouncements about its influence on the reproductive processes. Androgenic substances appear to stimulate the accessory glands of the male genital apparatus and also to improve sexual desire and performance. Their effect on spermatogenesis is uncertain.

The chronic intoxications most important with reference to infertility are those which originate within the body from foci of infection, notably in the mouth and in the nasal sinuses. It is a question whether the toxins circulating in the blood stream directly poison the germinal epithelium or whether they act primarily by depressing endocrine function. In favor of the latter hypothesis is the fact that not only in sterility but also in many other disorders the efficacy of organotherapy is relatively diminished as long as chronic focal infections are present. One of the commonest conditions found in sterility cases is chronic prostatovesiculitis. In the past it was thought that this condition depresses fertility by creating an environment hostile to the spermatozoa while they are passing through the genital ducts. To a certain extent that may be true. But since chronic prostatovesiculitis produces in the spermatozoa morphologic abnormalities identical with those caused by focal infections in other parts of the body, we have come to feel that its chief harmful effect results from the action of a constitutional rather than a local mechanism.

While it has repeatedly been shown that one or another type of deficient nutrition can depress the fertility of laboratory animals, there is small reason to believe that the ordinary mixed human diet often has this effect except in cases in which it includes too little protein. Insufficient exercise causes a slowing down of the normal metabolic processes with results, for example lowered fertility and obesity, similar to those produced by metabolic underfunctions of endocrine origin.

Most of the causes of human infertility are due directly or indirectly to environment, and in particular to the artificial conditions of civilized life. One has come to recognize however, a small group of cases in which a hereditary tendency to low fertility, intensified by the accidental mating of individuals possessing that trait, ultimately results in the dying out of their stock. Thus may be explained the barrenness of certain marriages in which neither partner presents any demonstrable obstacle to reproduction. A family history of infertility should always be taken into consideration in formulating a prognosis.

This paper has given a summary of modern views on the fundamental nature of those adverse influences which make conception unlikely or impossible. The number and diversity of such factors indicate that complete diagnostic study is the only basis on which the best results of treatment can be obtained. A project of this sort requires group organization, in which the work of the urologist must be closely correlated with that of his associates in the fields of gynecology, internal medicine and endocrinology.

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TESTICULAR BIOPSY

ITS VALUE IN MALE STERILITY

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The ever increasing interest in the study of male infertility has stimulated investigation of spermatozoal physiology, semen abnormalities and the pituitary-gonadal relationship, but the microscopic study of testicular tissue, accessible as it is, has been neglected.

An important step in this direction was made by Huhner¹ in 1913, who advocated testicular aspiration as a diagnostic measure in instances of azoospermia. In the performance of this test, recovery of spermatozoa in the testicular aspirate connotes active spermatogenesis despite the absence of spermatozoa from the semen and indicates, by inference, the presence of obstruction in the seminal tract. While this procedure represents a step forward in the study of testicular spermatogenic function, it has its limitations. Irrespective of the caliber of the needle employed for the aspiration, it often happens that no secretion is obtained. Moreover, the specimen of testicular secretion may be devoid of spermatozoa only because the particular seminiferous tubules that were reached were relatively inactive, whereas in other tubules in close proximity spermatogenesis may be advanced. For these reasons, data derived from testicular aspiration are conclusive only if spermatozoa are recovered.

Even when spermatozoa are found, the value of testicular aspiration is limited to the differentiation between obstructive and nonobstructive azoospermia. Lesser faults in spermatogenesis leading to varying degrees of oligozoospermia cannot be investigated by this method.

In order to determine the actual state of testicular function it is necessary to adopt a procedure, such as testicular biopsy, which will allow direct microscopic observation of the seminiferous tubules. As its name implies, testicular biopsy consists of the operative removal of a piece of tissue from the testis, so small as to have no deleterious effect on the gland yet large enough to include a representative group of tubules. This was first performed experimentally by Engle and clinically by Hotchkiss.² The application of testicular biopsy to human beings has been generally limited to the differentiation of the two kinds of azoospermia previously mentioned.³

In this preliminary report I am privileged to emphasize the simplicity of the technic of testicular biopsy and to recommend its wider application in male infertility.

TECHNIC OF TESTICULAR BIOPSY

The technic of testicular biopsy is simple and can be performed in the office if strict aseptic technic is available.

The testis, with the scrotal skin taut, is held in the operator's left hand. After application of an antiseptic, a portion of the skin overlying the anterior surface of the testis is infiltrated with 1 per cent procaine hydrochloride. An incision about 1.5 cm. long is made through the skin and carefully carried through all the

fascial layers until the parietal layer of the tunica vaginalis is opened. This is signaled by the escape of serous fluid and the appearance of the glistening visceral layer of the tunica vaginalis. The latter and the tunica albuginea are nicked with a small scalpel. Gentle pressure on the testis now serves to extrude a small bead of tissue, which is cut off with a curved iridectomy scissors. The testicular incision need not be sutured. The skin is closed with two interrupted catgut sutures and a collodion dressing applied. The patient may return to his former duties the following day, a suspensory being worn for a day or two. The specimen of tissue is preserved in Bouin's solution, mounted in paraffin for section and stained by hematoxylin-eosin.

MICROSCOPIC APPEARANCES IN TESTICULAR BIOPSY

Examination of the normal histologic section reveals a number of seminiferous tubules surrounded by interstitial tissue containing the cells of Leydig. Each seminiferous tubule consists of a connective tissue basement membrane supporting a number of layers of specialized epithelial cells in different stages of sper-

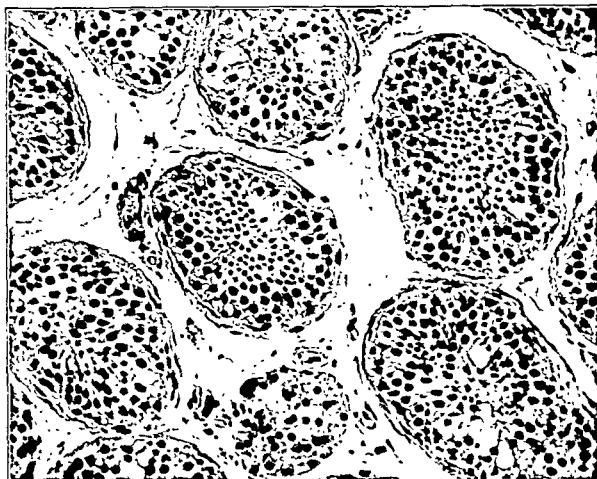


Fig. 1 (case 1).—Normally functioning seminiferous tubules. The three zones are well illustrated. Reduced from a photomicrograph with a magnification of 250 diameters.

matogenesis. The deepest layer consists of cubical cells, which enlarge to form spermatogonia. Some of the spermatogonia may be observed in mitosis, forming two or three layers of large polyhedral cells, spermatocytes, which constitute the second zone. The spermatocytes further divide to form the third zone, a layer of small polyhedral cells, spermatids, each of which develops into a spermatozoon. In addition to these three layers there may be seen a number of elongated columnar cells, the cells of Sertoli.

It is not my intention to discuss the various pathologic states involving the seminiferous tubules that may be observed. Suffice it to state that they may be generally classified into two groups: those due to incomplete maturation, in which instance cell division stops at the first or second zone, and those caused by degenerative lesions in a fully matured tubule.

CLINICAL APPLICATION OF TESTICULAR BIOPSY

Since testicular biopsy gives the most direct evidence of the actual state of spermatogenesis, it may be utilized to great advantage in any instance in which a pathologic disturbance of the seminiferous tubules is

Read before the Section on Urology at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

1. Huhner, Max: *Sterility in the Male and Female and Its Treatment*, New York, Rehnman Company, 1913. *Aspiration of the Testicle in the Diagnosis and Prognosis of Sterility*, *J. Urol.* 19: 31 (Jan.) 1928.

2. Engle, E. T.: Personal communication to the author.

3. Lane-Roberts, Cedric; Sharman, Albert; Walker, Kenneth, and Wiesner, B. P.: *Sterility and Impaired Fertility*, New York, Paul B. Hoeber, Inc., 1939.

suspected. It is especially valuable in male infertility under the following circumstances:

1. In azoospermia, to differentiate between the obstructive and nonobstructive types.
2. In oligozoospermia, to determine the severity of the pathologic process and to differentiate between faults in spermatogenesis and postinflammatory obstructive lesions of the ejaculatory ducts.

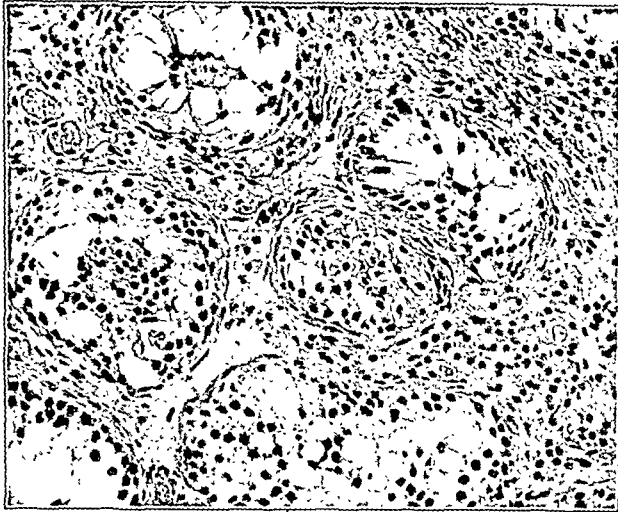


Fig. 2 (case 2).—Degenerative changes in the seminiferous tubules. Reduced from a photomicrograph with a magnification of 250 diameters.

genesis and postinflammatory obstructive lesions of the ejaculatory ducts.

3. As a prognostic gage, to observe the severity of the pathologic process and thus determine the capacity of the tubules to regenerate.
4. As a therapeutic gage, to evaluate by repeated biopsies the efficacy of the various extracts recommended for stimulation of spermatogenesis.

Accordingly, I have performed testicular biopsy on a series of forty infertile patients presenting various

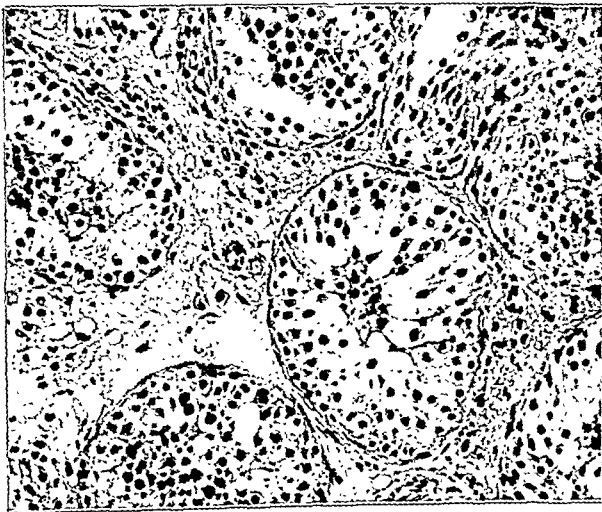


Fig. 3 (case 3).—Immature seminiferous tubules. Central tubule shows failure of development of the third zone. Reduced from a photomicrograph with a magnification of 250 diameters.

types of semen abnormalities. No untoward reactions were encountered. While the number of patients is still too small to permit any generalizations, the value of the procedure in male infertility and the justification for its further application are well illustrated by the following sample case reports:

GROUP 1. REPORTS ILLUSTRATING THE VALUE OF TESTICULAR BIOPSY IN AZOOSPERMIA

CASE 1.—J. D., aged 29, had a small left testis and an indurated lower pole of the epididymis in an otherwise normal right testis. Semen examination revealed azoospermia. Testicular biopsy revealed failure of development of the seminiferous tubules on the left side. The right testis showed functioning tubules with normal differentiation of the lining epithelial cells (fig. 1). Epididymovasostomy was therefore performed on the right side. Microscopic examination of the secretion obtained from the upper pole of the right epididymis, during the course of the operation, revealed numerous spermatozoa, corroborating the observations of the testicular biopsy.

CASE 2.—J. R., aged 32, had had bilateral gonorrheal epididymitis. Physical examination revealed induration in the lower poles of both epididymides. Testicular aspiration yielded no spermatozoa on the left side and from 2 to 3 spermatozoa per high power field on the right. Testicular biopsy revealed poorly functioning tubules bilaterally, indicating that the semen would be deficient in spermatozoa even if the obstruction was relieved (fig. 2). Operation was not advised.

Without testicular biopsy it would not have been possible in these two cases to determine the state of spermatogenesis and the advisability of operation.



Fig. 4 (case 5).—Atrophy of the seminiferous tubules. Note normal appearance of cells of Leydig. Reduced from a photomicrograph with a magnification of 250 diameters.

GROUP 2. REPORTS ILLUSTRATING THE DIAGNOSTIC VALUE OF TESTICULAR BIOPSY IN OLIGOZOOSPERMIA

CASE 3.—B. F., aged 24, had had gonorrheal infection apparently cured before marriage. Physical examination was negative except for an indurated left seminal vesicle. Prostatic infection was present. Semen examination revealed a volume of 2.5 cc., 6,800,000 spermatozoa per cubic centimeter and 43 per cent abnormal forms. Testicular biopsy revealed failure of maturation of most of the tubules, indicating the need for stimulation of spermatogenesis (fig. 3).

CASE 4.—J. K., aged 42, had from 15 to 20 white blood cells per high power field in the prostatic secretion. The semen was very viscid and had a volume of 1.5 cc., a count of 1,200,000 spermatozoa and 12,000,000 white blood cells per cubic centimeter. Testicular biopsy showed actively functioning seminiferous tubules. It was therefore concluded that the reduction in semen volume and sperm count was due to ejaculatory duct obstruction occasioned by a long standing seminal vesiculitis. Treatment was therefore directed toward the elimination of the chronic infection.

As illustrated by both cases, testicular biopsy serves to differentiate between the obstructive and nonobstructive types of oligozoospermia. In the first instance (case 3) the oligozoospermia was proved to be the

result of faulty spermatogenesis as shown by the state of the seminiferous tubules (fig. 3). In the second instance (case 4) it may be inferred from the finding of normal testicular tissue that the oligozoospermia was obstructive in origin. I am firmly convinced that, in many instances, oligozoospermia is caused by ejaculatory duct atresia rather than faulty spermatogenesis.

GROUP 3. REPORTS ILLUSTRATING THE VALUE OF TESTICULAR BIOPSY AS A PROGNOSTIC GAGE

CASE 5.—M. L., aged 30, had had bilateral orchidopexy at the age of 16 for cryptorchism. Physical examination was negative. The semen showed azoospermia. Testicular biopsy revealed tubules lined by a single layer of undifferentiated cells and filled with acellular hyaline shreds, corroborating the clinical impression of irreparably damaged seminiferous tubules (fig. 4).

CASE 6.—T. M., aged 27, had had bilateral orchitis complicating mumps at the age of 19. Examination revealed testes of normal consistency but reduced in size. The semen had a volume of 4.5 cc. with 3,500,000 spermatozoa per cubic centimeter. Testicular biopsy revealed complete atrophy of the seminiferous tubules on the right side. On the left, islands of normally functioning seminiferous tubules were found inter-

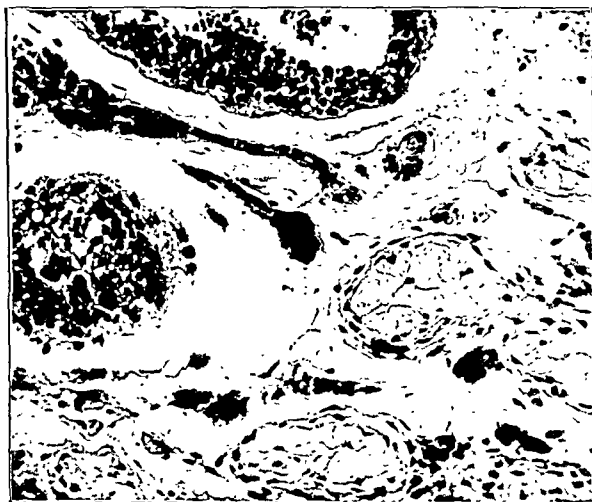


Fig. 5 (case 6).—Islands of normally functioning tubules interspersed among completely atrophied tubules. Note persistence of cells of Leydig in the atrophied area. Reduced from a photomicrograph with a magnification of 250 diameters.

spersed among atrophied tubules (fig. 5). The impression gained from this observation was that the tubules which had escaped destruction were already functioning at full capacity and that further stimulation was useless.

It is obvious that no regeneration can be expected in seminiferous tubules that have undergone complete atrophy, no matter how effective the therapeutic agent may be.

GROUP 4. REPORTS ILLUSTRATING THE VALUE OF REPEATED TESTICULAR BIOPSIES AS A CRITERION OF THE EFFICACY OF THERAPEUTIC AGENTS

CASE 7.—O. D., aged 24, was normal except for an infected prostatic secretion. The semen volume was 2.5 cc., with 4,600,000 spermatozoa per cubic centimeter. The patient was given intramuscular injections of 400 international units of gonadotropic hormone of pregnant mare serum three times weekly for a total of 12,000 international units. Reexamination of the semen following treatment showed no improvement (a volume of 2.5 cc. and a sperm count of 4,300,000 per cubic centimeter). Comparison of the testicular biopsies performed preliminary, to and following the treatment, however, showed a definite improvement in the histologic picture of the seminiferous tubules (figs. 6 and 7).

COMMENT

The performance of testicular biopsy before and after a given form of therapy yields more direct evidence of the efficacy of that remedy than any other method in use at the present time. While repeated examination of the semen furnishes evidence of the degree of prog-

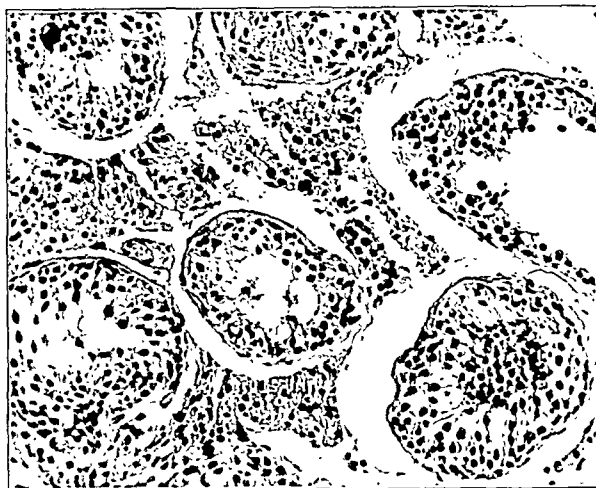


Fig. 6 (case 7).—Poorly functioning seminiferous tubules. Sperm count 4,600,000 per cubic centimeter. Reduced from a photomicrograph with a magnification of 250 diameters.

ress as a result of treatment, it is not an accurate yardstick because changes in the semen may occur which are produced by factors unrelated to the process of spermatogenesis. Reduction in the sperm count may, for instance, be produced by excessive frequency of coitus or by incomplete ejaculation resulting from the patient's difficulty in obtaining a specimen at an appointed time. Thus, an apparent increase in sperm population after a period of treatment may be merely



Fig. 7 (case 7).—Appearance after administration of 12,000 international units of gonadotropic substance of pregnant mare serum. Reduced from a photomicrograph with a magnification of 250 diameters.

the result of an improved method of collection of the specimen occasioned by repeated attempts.

On the other hand, increased cellular activity in the seminiferous tubules effected by therapy and demonstrated by testicular biopsy is true evidence of the effectiveness of the agent employed. Thus far I am subjecting only one product, gonadotropic hormone of

pregnant mare serum,⁴ to this critical investigation.

To date a total of five patients presenting varying degrees of faulty spermatogenesis, as judged by semen examination and testicular biopsy, were subjected to repeated testicular biopsies during the course of treatment. Each patient was given 400 international units of gonadotropic hormone of pregnant mare serum intramuscularly, three times a week for three weeks. Subsequent injections were administered intravenously thrice weekly for approximately two additional months, at which time a second testicular biopsy was done.

The observations on the five patients are summarized in the accompanying table. It is of interest to note that, although only three of the five patients showed an improved semen picture following the mare serum hormone therapy, all the patients presented histologic evidence of stimulation of the seminiferous tubules. These results, although limited to a small number of observations, are sufficient evidence to suggest that the administration of hormone of pregnant mare serum deserves further trial as a spermatokinetic agent.

Observation of the Spermatokinetic Effect of Gonadotropic Hormone of Pregnant Mare Serum in Five Infertile Males

Patient	Before Treatment		After Treatment		Changes in Tubular Activity as Observed by Testicular Biopsy
	Semen Volume in Cc.	Sperm Count per Cc.	Semen Volume in Cc.	Sperm Count per Cc.	
1. G. O.	2.5	16,400,000	3.5	29,600,000	Increased
2. D. M.	1.0	1,100,000	2.0	2,900,000	Increased
3. O. D.	2.5	4,600,000	2.5	4,300,000	Increased
4. J. B.	3.5	500,000	5.0	6,400,000	Increased
5. D. K.	3.5	10,100,000	3.0	29,000,000	Increased

CONCLUSIONS

1. Testicular biopsy is a simple, innocuous procedure as shown by its application in forty infertile patients without a single mishap.

2. Testicular biopsy is not only a definite diagnostic aid in differentiating between obstructive and non-obstructive semen defects but serves a prognostic function as well.

3. When performed before and after treatment, testicular biopsy yields the most direct evidence of the efficiency of the therapeutic agent employed.

1825 Pine Street.

ABSTRACT OF DISCUSSION

ON PAPERS OF DR. KREUTZMANN, DRs. MEAKER AND VOSE AND DR. CHARNY

DR. ROBERT S. HOTCHKISS, New York: Drs. Meaker and Vose exemplify what can be accomplished by team work between the two specialties of urology and gynecology. A complete history and careful general physical examination are as much a part of the examination of the husband as the semen studies. The new phrase "the inherent strength of the germ cell" is expressive. Not only do men differ greatly from one another in their state of fertility but certain men are particularly unstable and sensitive to adverse influences. A group of twenty-two men that I have studied for over a year demonstrates that those individuals who have unstable sperm counts are more apt to react violently to transient illnesses. The effect is not fully registered in the semen for from forty to sixty days. The clinical inferences are quite obvious. Dr. Charny's report on testicular biopsy promises much. This simple painless diagnostic procedure should be carried out as a preliminary step whenever doubt exists as to whether the azoospermia is due to asperma-

togenesis or occlusion of the seminal tract. Normal size and consistency of the testicle is no assurance that spermatozoa are being produced. If active and satisfactory spermatogenesis is observed in the section of the biopsy specimen and there is reason to believe that the obstruction is in the scrotal area there is no need for further diagnostic tests. Injection of the vasa with colored solutions does not test the usual and likely site of the obstruction, which is most apt to be in the globus minor of the epididymis. Furthermore, additional scar and occlusion may be produced at the site of the vasa puncture. If the biopsy specimen demonstrates grossly defective spermatogenesis, time and expense are saved. The knowledge of the endocrines as related to spermatogenesis is far from satisfactory. We have no entirely reliable, accurate and inexpensive tests to measure the functions of the ductless glands. Microscopic study of these testicular biopsies will ultimately allow one to predict which type of spermatogenic deficiencies will be amenable to endocrine stimulation. Should Dr. Charny's work lead to such an important advance, much of Dr. Kreutzmann's valid objection to indiscriminate treatment will be overcome. Second only to the importance of proper selection of the patient is the problem of maintaining patency at the site of the anastomosis. Drs. Draper, Kauer and I have recently undertaken a modification of the Martin operation designed to reduce or prevent postoperative stricture. Experiments on dogs convinced us that large gage silver wire can be left within the vas for weeks without producing important tissue irritation.

DR. MAX HUHNER, New York: As regards the criticisms of aspiration of the testicles with a needle, I have performed this simple procedure for over thirty years in scores of cases without any bad results. Nor have there been reported in medical literature any bad results by others. The objection made by Dr. Charny that I do not obtain material from several portions of the testicle does not hold in view of the fact that I do not simply stick the needle into the body of the testicle but insert it through the entire length of the testicle as well as the epididymis and continue the suction as I slowly remove the needle, so that I obtain samples from various portions of the testicle as well as from the epididymis. Such an objection would be more patent in testicular biopsy, as he obtains a specimen only from the small portion of the testicle just underneath his 1.5 cm. incision. I can see, however, that with the biopsy method much needed information can be obtained concerning the physiology and pathology of the testicles. I have not as yet done a testicular biopsy because I have obtained so much information from the simpler method of aspiration. By this method we can diagnose in any case of azoospermia whether the condition is due to occlusion of the genital tubes or to lack of spermatogenic function of the testicles or both. With my method I was the first to show as early as 1924 that an infection could be so slight as not to produce the characteristic nodules of an epididymitis but might still be severe enough to cause an occlusion of the genital tubes. Dr. Kreutzmann has covered the ground in an exhaustive manner. I am sorry that he did not mention the deleterious effect on the function of the testicle produced at times with the x-rays. If we do not think of this condition we shall not make the proper diagnosis, as the testicles feel perfectly normal; therefore the statement that when the testicles feel normal the lack of sperm is due to obstruction needs modification. Dr. Kreutzmann has very properly mentioned the condition of hypospadias as at times a cause of sterility. I wish to emphasize more fully than he did that the mere fact of a hypospadias being present, even if extreme, does not by any means indicate that that is the cause of the sterility. The only way one can diagnose this is by the postcoital or Huhner test, which, by the way, is a test for sterility in the male just as much as in the female. If after coitus one finds numerous spermatozoa in the female cervix one at once knows that a hypospadias, no matter how severe, has nothing to do with the sterility. Dr. Meaker and Dr. Vose for several years have covered the subject of sterility in all its aspects and have added much valuable information of their own. The most essential point which they have brought out is the value of group diagnosis especially as initiated and perfected by them.

4. Supplied by the Schering Corporation.

DR. HENRY SANGREE, Philadelphia: Fertility is a divided responsibility equally between the husband and the wife. To date the wife has been assigned most of the blame in a barren marriage. My investigations show that the male partner is at fault in about 50 per cent of childless unions. Team work should be present in a study of infertility and should include a gynecologic, obstetric, urologic, roentgenologic, endocrinologic and laboratory survey. The urologist by training and experience is particularly fitted to examine and treat the male partner in a sterile marriage. Between two and nine factors are often present in a study of both partners. In a study of the first hundred consecutive cases, among the congenital abnormalities were three cases of hypospadias, two cases of cryptorchism and four cases of Froelich's syndrome with atrophy of genitalia. Chronic prostatitis occurred in twenty-one. I consider this an important cause of the lowering of the fertility index and believe treatment should be given for this condition. The thick, viscid ejaculate and infective pus in a grade 1 to a grade 5 prostatitis appears to entangle and immobilize spermatozoa in the same comparative proportion that the viscid pus from a chronic endocervicitis causes sterility in the female. Epididymis-vasostomy has been done in 3 per cent of my cases with one success. Two of the men gave a history of scrotal trauma, one with a football injury and one during his work in a factory. In each of these cases a small threadlike vas was present on the side of trauma, and in the opposite side a small hydrocele was present of about 15 cc., not diagnosed preoperatively. Both had azoospermia and only a few mobile sperm were found in one of the cases at the operating table. An innovation in procedure was instituted in the last operation. The wife was also brought into the operating room, timed thirteen days after the beginning of her menstruation, which the gynecologists tell us is the optimum time, and artificial insemination was done before anastomosis, with sperm from the epididymis. Unfortunately this is without success to date. Impotence not only is the inability of insemination but includes failure of the erector mechanism. Two patients were successfully subjected to the impotence operation devised and perfected by Dr. Lowsley of New York. They were both hospitalized and were given a most thorough medical, endocrine and psychiatric preoperative examination. Endocrine investigation has made rapid strides in the last decade. It is deplorable that no simple practical test has been devised for the anterior lobe of the pituitary gland. The Fluhmann test in either the blood or the urine has not been satisfactory in my hands. Though not particularly emphasized to the present time, basal metabolism tests should be done as a matter of routine. Twenty-one cases of hypothyroidism occurred ranging from minus 5 to minus 42. The careful survey, group endeavor and treatment of both partners in childless marriages will lead to a greater percentage of successful results.

DR. W. W. WILLIAMS, Springfield, Mass.: I am interested in the emphasis which has been placed on azoospermia and aspermia, since the semen analysis of 110 consecutive cases from sterile matings in my series revealed only one case in which no spermatozoa were delivered. The low incidence of aspermia in this series is possibly because some of the patients avoided general sterility studies. There were others whose spermatozoa were so scarce that they were difficult to find, and the density of the spermatozoa or the count varied markedly through the whole series. It is often difficult to say just what is responsible for the deficiency of spermatozoa and the abundance of abnormal cells which occur in these samples. Out of a group of twenty-one cases in which the basal metabolic rate had been determined in addition to the studies on spermatogenic pathology, two were so deficient in spermatozoa that they could not be examined for pathologic changes. Of the nineteen which were examined, seven showed a minus basal metabolic rate of 10 per cent or below, and the other twelve a basal metabolic rate of higher than 10 per cent. The low group showed an average of 30 per cent pathologic cells and the more normal group 27 per cent, which in a small series of this kind would be fairly normal fluctuation. This does not in the least indicate that thyroid deficiency may not be a factor. In some of these cases there was a very low basal rate and possibly the thyroid was a factor in causing spermatogenic anomalies; but certainly it is not very well proved.

There is another point which has a bearing on the appearance of azoospermia: It was generally noted in this series that the rate of spermatogenesis was lowered in cases in which there were increased numbers of pathologic forms. As the rate of spermatogenesis diminished, the rate of formation of pathologic cells increased. Had the decreased number of spermatozoa in the semen occurred as the result of a stenosis of the passages, one would expect that the ratio of abnormal forms would not have been increased.

DR. HENRY A. R. KREUTZMANN, San Francisco: Some phases of sterility in the male can be diagnosed and treated only by the urologist. It is therefore most important that the urologist establish a thorough method of diagnosis and treatment in these cases. Dr. Hotchkiss's statement that the injection of a needle in the vas may produce stenosis at that point is well taken. I have had the opportunity in a number of cases to examine the vasa months after such injections had been made and have found that the lumen in no instance was occluded by the introduction of the needle. I feel that injection of the dyes is a simple and effective way of determining the patency of the vas, particularly when the needle is inserted as near the globus minor as possible. Infections of the vas deferens are much more common than is realized, as we showed in a paper on this subject presented before the American Urological Association in Minneapolis in 1937. The majority of the patients in whom cultures of the vasa were positive had no symptoms and the vasa appeared normal on gross examination, yet the lumen in many instances was completely blocked, preventing the passage of a silkworm strand. With regard to the number of cases showing no sperm, the number varied between 12 and 15 per cent. Sterility is an important subject for both men and women and I feel that in the future the urologist cannot perform all the necessary examinations himself, as there are too many factors involved. The ideal way of solving this problem and obtaining the best results is to have the urologist associated with a laboratory man who is conversant with studies of the sperm, a gynecologist and an endocrinologist.

DR. CHARLES W. CHARNY, Philadelphia: Two patients with oligospermia illustrate the value of testicular biopsy in sterility. The first had a count of 4,600,000 spermatozoa per cubic centimeter with a large percentage of abnormal forms. Microscopic examination revealed the poor differentiation of the epithelium lining the seminiferous tubules, corresponding to the defective sperm population. The second patient had a count of 2,300,000 spermatozoa per cubic centimeter with only 18 per cent abnormal forms but with evidence of marked adnexal infection. Microscopic examination disclosed more active spermatogenesis than the previous one, and yet the sperm count was actually lower, serving to support the theory that a great number of patients with low sperm counts in the ejaculate possess testes undergoing normal spermatogenesis.

DR. FRANCIS R. HAGNER, Washington, D. C.: Dr. Hotchkiss spoke of the use of a splint in the vas deferens. I don't believe that the vas deferens has anything to do with the failure in my cases when it is open at the time of operation. I believe that the trouble is in the cut tubules, and I have always felt that any foreign body left in situ for any length of time rather tends to form fibrous tissue and there is more chance of preventing this sinus forming between the cut ends of the tubules and the vas deferens. I am not opposed to it at all. I am going to try it, but that has just been my reaction to it as it has been done before. Dr. Huhner reported the single case in which the epididymis was punctured for examination, with a report of live spermatozoa being found. When I operated on the man while he had the small abscess, the other epididymis was absolutely structureless. It was red and looked almost like a piece of liver. I felt that possibly the introduction of the needle had some effect. That is the only case in which I have operated in which previous puncture had been done. I used dye at the time of operation early in my work. It might be all right to use it before operation, but at operation everything gets messed up with it and one can't make the tissues out as well. So I gave it up at the time of operation. I also feel that if the occlusion in these patients is farther up than one can get a silk gut probe, one can't do anything for those cases in the operative procedure from the lower end.

ASTHMATIC BRONCHITIS FOLLOWING CHRONIC UPPER RESPIRATORY INFECTION

A FIVE YEAR STUDY OF 235 CONSECUTIVE CASES
SEEN IN PRIVATE PRACTICE

LEE BIVINGS, M.D.

ATLANTA, GA.

In the presentation of this material I do not wish to disparage the study of bronchitis of allergic origin but to call attention to the frequency of chronic infection of the upper respiratory tract especially when accompanied by bronchitis with wheezing, which is subsequently referred to as asthmatic bronchitis. This clinical entity occurs frequently in pediatric practice and I shall attempt to define it and to show that it is primarily an infectious process. In a review of recent medical literature¹ and in textbooks² it seems to be considered a part of asthma, but while it may occur in the asthmatic child it would seem distinct and different from allergy unless bacterial hypersensitiveness may be considered an allergic phenomenon.

Any group of symptoms which distinctly impair the health of the child certainly should be honored as a



Fig. 1.—Infiltration of right upper lobe, February 19.



Fig. 2.—Little change in right upper lobe, February 22, with increasing reaction in left lower lobe.



Fig. 3.—Considerable clearing of infiltration, February 27, leaving behind a peribronchial reaction and a number of discrete glands.

clinical entity. When chronic upper respiratory infection becomes severe enough to cause the following symptom complex, it has attained the classification of a definite disease:

SYMPTOM COMPLEX

The symptom complex which occurs almost exclusively in winter, consists of:

1. Cough, often paroxysmal in character, resembling whooping cough, occurring usually in the early morning or when retiring, rarely during the day unless after severe exertion.
2. Malodorous breath, especially in the morning.
3. Anorexia and loss of weight.
4. Recurring colds.
5. Abdominal pain and nausea.
6. Profuse night sweats (not present in all cases).
7. Bronchitis, frequently unilateral, more likely to occur if the condition has existed for some time.

Physical examination reveals that:

1. The child appears anemic and suffering from malaise.
2. Fever is usually present to a slight degree.
3. The nasal mucosa is engorged and red with a coating of mucopurulent secretion. Frank pus is often seen in the floor of the nasal passages.
4. The tongue is heavily coated.

Read before the Section on Pediatrics at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

1. Mitchell, A. G., and Cooper, M. L.: *Vaccine Treatment of Asthma in Childhood*, Arch. Pediat. 48: 751 (Dec.) 1931.
2. Griffith, J. P., Crozer, and Mitchell, A. Graeme: *Diseases of Infants and Children*, Philadelphia and London, W. B. Saunders Company, 1937, p. 691.

5. The pharynx is red with islands of lymphoid tissue appearing prominently. A mass of mucopurulent material is often seen behind the soft palate.

6. Resistance to pressure is often found in the right upper quadrant of the abdomen.

Laboratory examination reveals:

1. Severe secondary anemia present in almost all cases and often as low as 45 per cent (Newcomer).
2. A slight rise in the total white cell count and a slight increase in the relative neutrophil count.
3. Usually absence of eosinophils in increased amounts on nasal smears stained with Wright's stain.
4. Usually pure culture of streptococci or staphylococci or a mixed growth of these two organisms on culture of the nasopharynx.

ASTHMATIC BRONCHITIS

During the first few years of life attacks of bronchitis are often accompanied by wheezy respiration and the physical signs characteristic of asthma. Attacks of this kind are often spoken of as "asthmatic bronchitis."³

They differ from asthma:

1. In being continuous rather than paroxysmal.
 2. In the constant presence of a local infection.
 3. In the failure to respond satisfactorily to epinephrine.
- Allergy seems to play little part in their production.

Specific sensitiveness cannot be demonstrated. Nor is there eosinophilia.

BACTERIOLOGY

Cultures taken from the nasopharynx by sterile loop and grown in bouillon incubated over twenty-four to forty-eight hours and stained with Gram's stain or grown on blood agar yielded streptococci (viridans and hemolytic) thirty-eight times, staphylococci (aureus and albus) nineteen, catarrhalis four, staphylococci and streptococci ten, streptococci and pneumococci once and a gram-negative rod once; total, seventy-three.

EFFECT OF TONSILLECTOMY

Operations for removal of tonsils and adenoids had been done in 30 per cent of the cases; it would seem that the operation has no beneficial effect on the course of the infection or in preventing recurrences.

INFLUENCE OF SEX

There were 110 girls and 125 boys.

COMPLICATIONS

Asthmatic bronchitis occurred in approximately 35 per cent.

Otitis media was present in approximately 3 per cent.

3. Holt, L. Emmett, and Howland, John: *Holt's Diseases of Infancy and Childhood*, revised by L. Emmett Holt Jr. and Ruskin McIntosh, ed. 10, New York and London, D. Appleton & Co., 1933, p. 754.

Recurrences were experienced in seventy-one cases, or 30 per cent.

TREATMENT

1. *Supportive.*—A generous diet was prescribed, with cod liver oil, increased rest and definite treatment of the anemia. This seemed best accomplished by oral administration of from 6 to 9 grains (0.4 to 0.6 Gm.) of crystals of ferrous sulfate in a vehicle (elixir) of thiamine hydrochloride containing 250 units per teaspoon.

2. *Local Treatment.*—Nasal tampons of 1 per cent ephedrine were used for ventilation and drainage. In some instances in which the discharge was profuse, a Sonderrmann suction pump was used twice daily at home by the mother.

3. *Foreign Protein Therapy.*—Autogenous vaccines were first used and abandoned because the results did not seem to justify the increased cost to the patient. It is also probable that the bacterial count was too low. Stock vaccine (mixed) of a very high count was then used with a high percentage of good results. In the last few months I have been taking cultures in every case and using a mixed autogenous vaccine of a high count which matched the culture of a given case. For instance, if the culture showed streptococci, a streptococcus vaccine was given in a dosage of 0.2 cc., increasing 0.1 cc. each dose to a maximum of 1 cc. at three day intervals for the first four doses and weekly intervals for a total of from six to ten doses. Staphylococcus toxoid (No. 2 dilution) was used in some instances of staphylococcal infection.

4. *Chemotherapy.*—Sulfanilamide proved useful in the acute cases of asthmatic bronchitis but seemed valueless in the chronic infection.

RESULTS

The child usually remains relatively free from infection for months and sometimes years. A few children do not respond to treatment.

CONCLUSIONS

It would seem that the problem of treating these children is far more than one of local nasal treatment but one of deficient immunity with subsequent ill effects on the well-being of the whole body. All these factors must be considered in restoring the child to a normal state of health. The frequency of occurrence, the wintertime incidence, the presence of fever, the constant presence of infection, the absence of eosinophilia and the response to specific vaccine therapy would seem to entitle this clinical syndrome to a place of its own in pediatric practice, making it amenable to the care of any pediatrician and separating it from the field of allergy except when it occurs in the asthmatic in spite of the asthma and not because of the asthma.

REPORT OF CASE

The following brief summary of the history and physical examination,¹ with three roentgenograms, illustrates some of the characteristics of asthmatic bronchitis:

Barbara D., seen in February 1940, aged 4½ years, complained chiefly of wheezing and fever. Asthma had been present in a grandmother and an uncle. The tonsils were removed in 1938. The patient had pneumonia in 1938 and 1939 similar to the present illness. Physical examination revealed congestion in the nose, moist rales over both lungs posteriorly and the right upper lung anteriorly. There was an expiratory wheeze. Laboratory examination revealed hemoglobin 83 per cent, red blood

cells 5.08 million and white blood cells 11,500 with 73 per cent polymorphonuclear neutrophils. The urine was normal. A tuberculin test was negative.

COMMENT

The history of repeated pneumonias is common. The history of allergy in the family is not common. The onset with a cold, fever and wheezing is common. The physical signs are characteristic. The blood picture of an increase in the total white count of moderate degree and slight rise in the neutrophil count is the usual finding. The negative tuberculin test is important, since there is often suspicion of tuberculosis, so reported by the roentgenologist. X-ray examination February 19 (fig. 1) showed infiltration of the right upper lobe. February 22 (fig. 2) there was little change in the right upper lobe and an increasing reaction in the left lower lobe. This may have been a tuberculous pneumonia. By February 27 (fig. 3) the infiltration had cleared considerably leaving behind a peribronchial reaction and a number of discrete glands. "I still feel that this was a tuberculous pneumonia" (roentgenologist's opinion).

These roentgenograms illustrate the changing position of the pathologic condition in the lungs so often seen in asthmatic bronchitis, the most common location being in the left lower lobe posteriorly, where the bronchitis is characteristically unilateral.

The peribronchial reaction is also characteristic and often results in a roentgenographic diagnosis of juvenile or childhood tuberculosis.

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ABSTRACT OF DISCUSSION

DR. HAL M. DAVISON, Atlanta, Ga.: All children showing the syndrome described by Dr. Bivings should be treated as he has suggested. If the treatment is not successful, the patient should undergo thorough allergic study. No one, seeing the work of Jackson in Philadelphia, would doubt that there is some relation between bronchiectasis and chronic bronchial infections and infections in the sinuses. Wolf and others have shown that there is a definite drainage from the sinuses into the bronchial and mediastinal lymph nodes, so we cannot argue the relationship between infection in the upper respiratory tract and infection in the lungs. Among adult asthmatic patients the presence of chronic sinus infection detracts from their chances of relief, and x-ray treatment sometimes gives the only relief that can be produced. I have seen a few cases of asthma in children relieved by x-ray treatment for enlarged mediastinal nodes, after other treatment had failed. On the other hand, among both children and adults, numbers of cases apparently infectious do not improve until treated for allergy, and, after definite allergic treatment has been carried out, the infection disappears. No one can explain just why 35 per cent of Dr. Bivings's children should wheeze and 65 per cent should not wheeze. There must be a definite difference between such groups. Allergic sensitivity cannot be demonstrated in all these cases of wheezing, but that does not mean that it is not there. I have seen some adults with seasonal fall hay fever who give no positive cutaneous reactions yet obtained perfect results from ragweed pollen extract and have recurrence of symptoms if not so treated. The absence of eosinophilia is of little help in diagnosis here. Piness of Los Angeles, Bray of London, and Kern and Crompton of Philadelphia have presented results of research on the confusing pictures certain allergic syndromes in children offer in resembling pneumonia, and the resemblance of certain initial mucosal changes of infection to those of allergy. Therefore, since we frequently cannot determine whether these children are allergic, whether they are allergic to the infection or to something else, it seems that individual indications would be the logical procedure of handling.

DR. WARREN QUILLIAN, Coral Gables, Fla.: The symptom complex described by Dr. Bivings and classified under the title of asthmatic bronchitis occurs frequently in pediatric practice.

¹ By courtesy of the Eggleston Hospital for Children.

A recent review of about 2,000 case records in the lower coastal region of Florida indicates that 47 per cent of this series consists of respiratory infections (Quillian, W. P.: *Respiratory Infections*, *J. Pediat.* 15:704 [Nov.] 1939). Many children, brought to this resort center during the winter months in an effort to avoid sudden extremes of temperature, continue to have mild infections of the upper respiratory tract. But a large percentage of these patients who have previously experienced successive attacks of asthmatic bronchitis as a complicating factor find relief. The combined clinical experience of several pediatricians in this area confirms this impression emphasized by the author today concerning the predisposing effect of cold weather. Chronic disease of the paranasal sinuses is often discovered in this clinical syndrome. It is possible that constant absorption from such a low grade focal infection may create a bacterial allergy. The mucopurulent material may drip into the pharynx and by continuity of tissue involve the lower respiratory tract. There seems to be a lowered immunologic response among these patients. A high incidence of allergy in the family history makes one feel that there is an altered constitutional make-up. Otherwise, more children with chronic upper respiratory infections would develop asthmatic bronchitis. There is no substitute for careful physical examination. Permanently good results from therapy may depend on careful elimination of predisposing factors. In the use of autogenous vaccines one should bear in mind the changing bacterial flora of the nose and throat. A vaccine which is effective this year may require modification the next. All supportive measures designed to create a normal immunity to infection may be worthy of trial in the individual case. My experience confirms the belief expressed by the author that asthmatic bronchitis is a distinct clinical entity. The results from therapy have too often been a temporary amelioration of symptoms without permanent relief from the syndrome.

DR. HARRY LOWENBURG JR., Philadelphia: Dr. Bivings stated that the vaccine which he prepared contained 4 billion organisms in each cubic centimeter. In the past two years I have had occasion to take cultures of the nose and throats of more than a hundred children with chronic sinus infections, many of them associated with asthmatic conditions. In only three of these children did I get a pure culture, and in the subsequent production and administration of the vaccine I found that those children who had an associated asthmatic condition could not tolerate a dose of much more than 5 million organisms at the start of the course of injections. These children would receive severe local and occasionally general reactions even with such small doses. It has been my custom to have the vaccine made up with 500 million organisms to the cubic centimeter and give about a million organisms as an initial dose. The method of preparation of the vaccine that I have used was taught to me by Dr. Cooper at the Children's Hospital in Cincinnati. The individual organisms obtained are made into a separate vaccine. The patient is then skin tested with a small dose of each organism and, depending on the reaction obtained in twenty-four hours, the combined vaccine is prepared directly in proportion to the severity of the reactions. It has been my experience that those children giving the more severe reactions to the cutaneous tests derived the greatest benefit from the injections. There has been mentioned this morning the factor of undernutrition in these children. I have noticed that many of these children, instead of being undernourished, are on the obese side, and have found that with reduction in weight their general resistance has seemed to improve a great deal.

DR. FRANK LEE BIVINGS, Atlanta, Ga.: I want to emphasize two main points with regard to this study: First, that chronic upper respiratory infection in children is a very frequent occurrence; second, that asthmatic bronchitis primarily is infectious in origin, although there may be an allergic background which is a complicating or in some instances a predisposing factor. But it seems to me that asthmatic bronchitis as a clinical entity must be considered a bacterial infection and treated as such. Dr. Quillian brought up a point with regard to changing bacterial flora. I have not gone quite far enough yet to have definite data on that subject, but in some of the children on whom I have made bacteriologic studies I have found that one time they may have a streptococcal infection predominating and in the next instance a catarrhalis or some other type of infec-

tion. Therefore the autogenous vaccine and culture preceding each treatment would seem to be indicated. My experience has not been the same as Dr. Lowenburg's in regard to bacterial count. My vaccine was begun with low counts and the results were not entirely satisfactory, and for that reason the counts were increased. If one remembers that pertussis vaccine, on which so many rely, has a count of 20 billion to the cubic centimeter, one need not fear severe reactions in these children. I have not seen reactions occur after the first dose, except in unusual instances. I usually start them with about 0.25 cc. of a 6 to 8 billion count. In this study I tried to simplify the bacteriologic studies as much as possible. I did not go as far as Dr. Lowenburg said he had, because I am doing private practice and have to do these things as simply as possible. With the cooperation of the Emory University Department of Bacteriology I have worked out a technic by which I thought I could get good clinical results without having to go into detailed bacteriologic studies. For that reason I culture and grow the predominating organism and try to identify it as simply as possible and use that vaccine. My experience with regard to nutrition in these children is different from that of Dr. Lowenburg. I think he has in mind the asthmatic child rather than the asthmatic bronchitis child, because in those that I have seen the nutrition certainly had been far below normal in almost every instance, and one of the most noticeable clinical improvements is the rapid gain in weight that these children get after they have been treated.

INTRAMURAL POSTGRADUATE EDUCATION IN OBSTETRICS AND PEDIATRICS

FOR PRACTICING PHYSICIANS, FINANCED IN WHOLE OR IN PART FROM FUNDS APPROPRIATED BY CONGRESS FOR MATERNAL AND CHILD HEALTH SERVICES

EDWIN F. DAILY, M.D.

Director, Maternal and Child Health Division, U. S. Children's Bureau
WASHINGTON, D. C.

Short clinical postgraduate courses in obstetrics and pediatrics have been established by several state health departments in cooperation with medical schools and hospitals with teaching services. These courses have been developed for practicing physicians who wish an opportunity to observe and learn of the most recent advances in obstetrics and pediatrics. Where postgraduate courses had already been established the health departments have occasionally provided stipends or tuition or travel to assist physicians otherwise unable to attend the courses. These short courses are not designed to prepare physicians to become specialists in obstetrics or pediatrics.

Of the maternal and child health funds \$138,984 has been budgeted by the state health agencies for intramural and extramural medical postgraduate education in obstetrics and pediatrics during the fiscal year ending June 30, 1941. This amount may include for different states either the salaries of instructors or stipends; tuition or travel for the postgraduate students.

The U. S. Children's Bureau, in approving the plans submitted by the states for this purpose, has felt that efforts to improve medical education are one of the most important parts of any program endeavoring to improve the health of mothers and children.

A brief summary of the courses financed in whole or in part from the social security funds is presented here for the benefit of physicians including obstetrics or pediatrics in their practice who may wish to attend such courses.

Courses in Obstetrics and Pediatrics

School	Length and Content of Courses	Date When Courses Begin	Number of Students Accepted for Each Course	Physicians Eligible	Registration Fees and Tuition	Approximate Cost of Room and Board	For Application Forms and Detailed Information, Write to
University of California, San Francisco	One week obstetrics, two weeks pediatrics	Obstetrics, Dec. 16, 1940, June 2, 1941; pediatrics, Jan. 6, 1941, May 19, 1941, June 16, 1941	15	Physicians participating in state maternal and child health programs in California, Arizona, Nevada, New Mexico, Utah	\$10 registration fee and \$80 tuition (paid by respective state departments of health)	\$11 to \$12.50 per week	The director of maternal and child health in state health department of California, Arizona, Nevada, New Mexico, or Utah
University of Chicago, Chicago	Five weeks obstetrics only	Aug. 26, 1940, Oct. 7, 1940, Nov. 11, 1940, every five weeks in 1941	5	Graduates of accredited medical schools	\$25 registration fee; \$10 returned on completion of course	\$16 per week	Chief, Division of Child Hygiene, State Department of Public Health, Springfield, Ill.
University of Illinois, Chicago	One week obstetrics and pediatrics combined	Summer months only	18	Physicians practicing in Illinois	\$10 registration fee	\$15 per week (state health department pays for room, board, and travel expenses not exceeding \$25 for a two weeks course)	Chief, Division of Child Hygiene, State Department of Public Health, Springfield, Ill.
	Two weeks obstetrics and pediatrics combined	Arranged on application	4	Physicians practicing in Illinois	\$10 registration fee		
Indiana University, Indianapolis	Two weeks obstetrics	Nov. 4, 1940, Jan. 13, April 14, July 7, 1941	6	Graduates of accredited medical schools (preference to physicians practicing in Indiana)	\$10 registration fee (refunded on completion of course)	Board and room on campus paid for by Indiana State Board of Health for Indiana physicians	Director, Bureau of Maternal and Child Health, State Board of Health, Indianapolis, Ind.
State University of Iowa, Iowa City	One week obstetrics	Alternate weeks Sept. 23, 1940, to June 28, 1941	3	Graduates of accredited medical schools in the United States under 55 years of age	None	\$10 to \$20 per week	Director, Division of Maternal and Child Health, State Department of Health, Des Moines, Iowa
Tulane University of Louisiana, Louisiana State University, New Orleans	Two weeks pediatrics	Not available	10	Planned primarily for Louisiana physicians; others may be accepted	\$75 tuition, paid by Louisiana State Board of Health for Louisiana physicians	\$26 per week paid by Louisiana State Board of Health for Louisiana physicians	Director, Division of Maternal and Child Health, State Board of Health, New Orleans, La.
	Two weeks obstetrics	Not available	8				
Tufts College Medical School, Boston	One week or one month; separate courses in pediatrics and obstetrics	Not available	Not available	Graduates of accredited medical schools in the United States	Tuition and registration fees paid by Bingham Foundation for Maine physicians	A stipend is paid by Maine State Department of Health	If resident of Maine, State Department of Health and Welfare, Augusta, Maine
Harvard School of Public Health, Boston	Four weeks, two days each week, pediatrics Four weeks, one day each week, obstetrics	Not available	4	Limited to physicians conducting child health conferences and antepartum clinics in Massachusetts	None	Not available	Director, Division of Child Hygiene, State Department of Public Health, Boston, Mass.
University of Minnesota, Minneapolis	One course of six days	Oct. 11, 1940	30 to 50 for each course	Physicians practicing outside Minnesota	\$3 registration fee applies on \$25 tuition for six day course and on \$15 tuition for the three day course	\$15 to \$18 per week; room, board and travel paid by state health department of Minnesota and North Dakota for physicians they select	If residents of Minnesota or North Dakota, respective state health departments; otherwise, to director of postgraduate medical education, University of Minnesota
	Two courses of three days each in the spring of 1941			Physicians practicing in Minnesota		\$14 per week	
University of Nebraska, Omaha	Two weeks obstetrics and pediatrics combined	Jan. 6, Jan. 20, Feb. 3, Feb. 17, March 3, March 17, March 31, May 19, 1941	4	Graduates of accredited medical schools	\$10 registration fee (refunded on completion of course)		Director, Division of Maternal and Child Health, State Department of Health, Lincoln, Neb.
Columbia University, New York Post-Graduate Medical School, New York	One month (three days each week)	November, December 1940, February, March, May, and June 1941	5	Graduates of accredited medical schools	\$40 per month tuition	\$10 to \$15 per week	If residents of New Jersey, Consultant, Bureau of Child Hygiene, State Department of Health, Trenton, N. J.
Columbia University, given at Margaret Hague Maternity Hospital, Jersey City, N. J.	Three months obstetrics	First day of each calendar month	2 each month	Graduates of accredited medical schools	\$25 registration fee; applicable on tuition of \$350	Full maintenance in hospital included in tuition	If residents of New York, Director of Division of Maternity, Infancy and Child Hygiene, State Department of Health, Albany N. Y.
Duke University, Durham, N. C.	One week pediatrics and obstetrics combined	Not available	5 or 6	General practitioners in North Carolina in practice at least three years	\$15 registration fee (returned on completion of course)	\$12 to \$13 per week paid by North Carolina State Board of Health	Director, Maternal and Child Health Services, State Board of Health, Raleigh, N. C.
University of Oklahoma, Oklahoma City	Two weeks obstetrics	Not available	4	Graduates of accredited medical schools	\$25 registration fee (\$10 refunded on completion of course)	\$8 to \$12 per week	Division of Maternal and Child Health, State Health Department, Oklahoma City, Okla.
Baylor University, Dallas, Texas	Four weeks obstetrics and pediatrics combined	Not available	20	Licensed physicians practicing in Texas, preference to age groups 25-55 in communities of less than 25,000 population	\$50 tuition paid by state health department for physicians of their selection	\$30 per week; maintenance paid by state health department	Director, Division of Maternal and Child Health, State Department of Health, Austin, Texas
University of Texas, Galveston	Four weeks obstetrics and pediatrics combined	Not available	20				
University of Michigan, Ann Arbor	Two weeks obstetrics	Every two weeks	4	Licensed physicians practicing in Michigan	None	\$10 per week	Director, Bureau of Maternal and Child Health, Michigan Department of Health, Lansing, Mich.
Wayne University, given at Children's Hospital, Detroit	One month pediatrics	Every month	1	Licensed physicians practicing in Michigan	None	\$50 per month	

PREVENTION AND TREATMENT OF
DECUBITUS IN FRACTURES

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AND

GEORGE L. APFELBACH, M.D.

CHICAGO

Decubitus is a major problem of a fracture service having an annual turnover of 1,400 patients. In spite of prophylaxis, its incidence is such that it frequently overshadows the original surgical condition requiring hospitalization. Bedsores often prevent open reduction.

The foreign and American literature offer little truly investigative work regarding etiology or prophylaxis. We here report a newly developed technic in the prophylaxis and treatment of decubitus.

A series of 232 cases were followed over a period of three months. The average age was 51 years. There were seventeen patients with fractured hips, from 60 to 95 years old, ten who were diabetic, six with fractured pelvis, and one who had a compression fracture with paraplegia. Of the original fifty-five patients six had

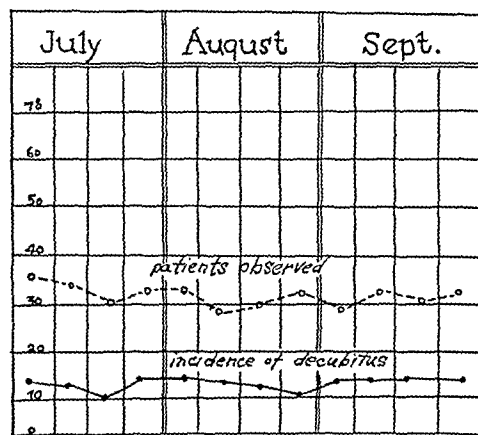


Fig. 1.—Group of patients treated by former accepted methods.

simple decubitus while twenty had deeply necrotic bedsores (chart 1).

Pressure is recognized as the chief cause of decubitus. It occurs usually over the sacrum, buttocks and heels, and less commonly over the malleoli, greater trochanters, scapulas and elbows. Pressure also occurs at the upper and lower edges of casts and at the ring of a Thomas splint. Trauma may be a contributing factor, caused by friction from bedclothes, rucks in sheets or dressings, gritty dusting powder or plaster, bedpans or other features of nursing care. Moisture, as in perspiration, urine or feces, macerates the skin and allows the entrance of infection. Senility, with its associated atrophy of the skin, is also a predisposing factor. Pressure areas due to lack of muscular development are more common in women. The skin of the Negro is less susceptible to decubitus. Hypovitaminosis is likewise a predisposing factor. Anorexia, poor dentures and associated dietary deficiency are common in the aged. The malnutrition and hypovitaminosis of alcoholic patients are well recognized. Hypoproteinemia with edematous skin, dehydration and chronic shock are frequently associated factors. Incontinence of urine or feces is com-

monly encountered, especially in the aged, and cord injuries lead to trophic disturbances with resulting infection. An increased incidence of bedsores in disease of the pancreas is recorded.¹

Love² classifies bedsores as follows: stage 1 (threatened), with generalized redness of the skin which blanches readily and immediately reappears when the pressure is released; stage 2 (inevitable), with increased redness which assumes a purple hue, pressure causing no blanching. Early a vesiculation occurs over the purple-red area. These small vesicles and blebs soon break, close scrutiny being required to discover them. The resulting weeping surface is ideal for infection. This stage passes into stage 3 (ulceration), with sepsis and toxic absorption.

We observed that these pressure areas resemble the blebs and vesicles of a second degree burn. Latimer³ also records this fact. In burns the skin is injured by thermal trauma with local edema and bleb formation. Decubitus pressure, from body weight or cast, causes dilatation of subcutaneous vessels and increased irritability of vasomotor endings in the skin; this results in the initial erythema with ready blanching on pressure. With continued pressure there is vasomotor paralysis and stasis. This accounts for the purple color and failure of the tissues to blanch on pressure, which in turn produces local edema and bleb formation.

Decubitus causes little pain, at least after the first day, probably owing to a pressure palsy of sensory fibers and to edema of the skin. With proper treatment only the first two stages should occur. Lesions in our cases never reached the stage of ulceration.

In the treatment of decubitus, prophylaxis is of the utmost importance. The breaking down of the skin must be avoided. With this in mind a "calamine varnish,"⁴ a mechanical and pharmaceutical aid, was developed. All pressure points are washed with tincture of green soap, alcohol and ether. The calamine varnish is applied with a brush and allowed to dry. Ordinary photographer's rubber cement is then spread over the same area and allowed to dry. These form a thick elastic coat over the points of pressure. The soothing astringent antiseptic coat, with its protecting layer of rubber, forms a pressure-proof, bacteria-proof, moisture-proof prophylaxis for decubitus. This is a routine procedure in the fracture ward. It may be repeated as often as necessary. It prevents the breakdown of tissue.

With urinary incontinence a Pezzar or Foley-Alcock⁵ catheter affords constant drainage. Frequent or continuous⁶ irrigation with 1 per cent phosphoric acid solution (to prevent alkaline cystitis) or alternately with 1:5,000 potassium permanganate solution should be given. We give ammonium mandelate or methenamine with sodium biphosphate for those intolerant to the former.

With male patients⁶ a funnel made of cellophane, rubber, or other moisture-proof material is fitted over the penis and connected by tubing with a drainage bot-

1. Meyer, K. A., and Amtman, Leo: Urinary Diastase Test in Peptic Ulcer Penetrating into Pancreas, *Am. J. Surg.* 33: 307 (Aug.) 1936.
2. Love, R. J. M.: Bedsores and Their Treatment, *Practitioner* 125: 277 (March) 1937.

3. Latimer, E. O.: Treatment of Decubitus with Tannic Acid, *J. A. M. A.* 102: 751 (March 10) 1934.

4. Tragaeanth 2 per cent, benzoic acid 1 per cent in Ringer's solution to make 100 per cent. Add to this prepared calamine N. F. 7.5 per cent and bentonite 2.5 per cent. The calamine and tragaeanth are well known emollients. The bentonite is a mildly antiseptic astringent aluminum silicate clay and the benzoic acid a preservative.

5. With a two way catheter, irrigation can be continuous by the gravity method with a screw clamp control.

6. Suggested by Dr. Frank Kelly, resident, Fracture Service, Cook County Hospital.

tle, preventing the severe urethritis of males so frequent with indwelling catheters. For anorexia and malnutrition, 5 units of insulin is administered subcutaneously one-half hour before meals. Fluids, usually from 3,000 to 5,000 cc. daily by mouth, are given in a routine manner or physiologic solution of sodium chloride or saline-dextrose solution is administered parenterally. The puffy red dry fissured tongue of dehydration is watched for. The benefits of a high vitamin diet, brewers' yeast, orange juice and cod liver oil become readily apparent by comparison with the control group (chart 2).

Careful observation of the patient's skin is essential. Should vesicles or macerations appear they are immediately debrided and sprayed with a 10 per cent solution of tannic acid and 1 per cent salicylic acid.⁷ When dry⁸ a 10 per cent solution of silver nitrate is painted over the area. This forms a black supple thin tough crust which gives a "new skin" surface and requires no further treatment.⁹ With infection and necrosis, fresh diluted solution of sodium hypochlorite is used freely. We do not cauterize exuberant granulations. This only adds a necrotic crust to a clean surface. A razor trims

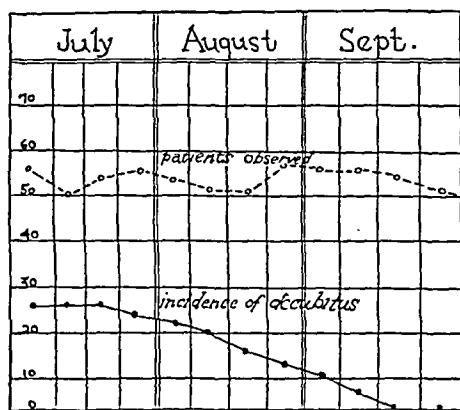


Fig. 2.—Group of patients treated with the calamine varnish and liquid rubber or tannic acid method.

the overgrowth of tissue to the level of the skin surface. Epithelium can then bridge the gap.

Since recovery in the twenty original cases, there have been no deep ulcerations. When clean they are treated as described. Skin grafts may be necessary. There was only one instance in our series. Latimer³ describes the use of tannic acid in the treatment of necrotic decubitus and this method has been used by Love,² Spiesman,¹⁰ Cope¹¹ and many others. Nayarac and Morel¹² described the use of 5 per cent silver nitrate to stiffen the skin in early lesions. Proper application of prophylaxis, as outlined, should in most instances prevent decubitus with fractures and chronic illness. With the simple treatment here outlined the existing bedsore readily heals. The prognosis of decubitus is improved. Patients requiring surgical therapy need not forego its benefits because of bedsores.

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FAILURE OF GELATIN OR AMINO-ACETIC ACID TO INCREASE THE WORK ABILITY

OF INDIVIDUAL NORMAL HUMAN MUSCLES

GEORGE L. MAISON, M.D.

DETROIT

The observation that gelatin was an effective agent in postponing human fatigue was made by Ray and his co-workers¹ in a now widely publicized paper which appeared in February 1939. To date no confirmation of this action of gelatin has appeared. Ray theorized that gelatin postponed fatigue by an action on the muscles themselves. He reasoned that creatine was a substance important in muscle chemistry, one of whose precursors in the body may be aminoacetic acid (glycocoll, glycine). Aminoacetic acid makes up 25 per cent by weight of gelatin. An added supply of aminoacetic acid was thought to increase the store of creatine in the muscles. If this is the mechanism by which gelatin acts, the effect should show up in increased work ability of a single human muscle during a period of gelatin or aminoacetic acid ingestion. Further, if gelatin has any action on fatigue its ingestion should increase the ability of individual muscles to do voluntary work, since the work of a single muscle requires cooperation of the circulatory, muscular and nervous systems just as does action of the body as a whole.

Experiments were therefore undertaken to test the work ability of a single human muscle before, during and after the ingestion of gelatin or aminoacetic acid.

METHOD

Male subjects fatigued the extensor digitorum communis muscle daily by doing work at a uniform rate. (The load was constant and the length and rate of contraction were constant.) Fatigue was defined as that condition in which the subject could not maintain the rate of work. In order to differentiate the ability of the neuromuscular system alone from the ability of the combined neuromuscular and circulatory systems, the right arm of each subject did its daily work without blood supply whereas the left arm retained its circulation during work.

A weight ergograph was designed especially for the extensor of the fingers.² The ergograph recorded on automatic counters the total distance through which the weight was moved and the total number of individual strokes made. A buzzer was included in the machine and contacts were so arranged that when the load was lifted to a set height the buzzer sounded. The subject was trained to lift the weights until the buzzer sounded and then to relax. Thus the strokes made were of nearly uniform length, about 6 cm. This is a comfortable stroke for the extensor if the metacarpophalangeal joint is used as a fulcrum, and the load is applied over the distal halves of the second phalanges of the fore, middle and ring fingers.

The definition of fatigue mentioned was made possible by the buzzer. The subject makes one contraction per second. When he can no longer ring the buzzer in the allotted time he ceases to work.

The blood supply to the muscle of the right arm was interrupted during its work by means of a sphygmomanometer cuff

From the Department of Physiology, St. Louis University School of Medicine.

1. Ray, G. B.; Johnson, J. R., and Taylor, M. M.: Effect of Gelatin on Muscular Fatigue, *Proc. Soc. Exper. Biol. & Med.* 40:157 (Feb.) 1939.

2. Construction details of the ergograph will be described in a subsequent paper.

7. This stimulates epithelization.

8. Drying is hastened by a hair drier or heat lamp.

9. Dressings roll, wrinkle and irritate. Tetanus prophylaxis should be routine.

10. Spiesman, M. G.: Bedsores (Decubitus), *Am. J. Surg.* 36:17 (April) 1937.

11. Cope, V. Z.: Prevention and Treatment of Bedsores, *Brit. M. J.* 1:737 (April 8) 1939.

12. Nayarac, P., and Morel, J.: Recherches sur l'escarre de decubitus, *Rev. de med.*, Paris 43:1265, 1926.

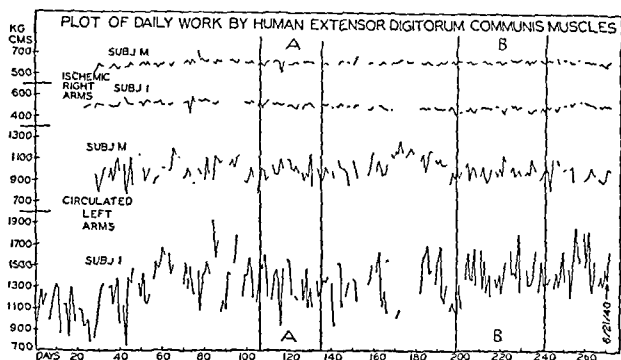
instantaneously inflated to a pressure of 240 mm. of mercury from a pressure reservoir of about 5 gallon capacity. Muscles worked under this condition are hereafter referred to as "ischemic."

RESULTS

The experiments were divided into two groups: The first group shows the effect of gelatin on muscles in the process of rapid training. This is analogous to Ray's procedure, since his subjects had trained for only thirty days before gelatin was taken.

The six subjects included four medical students between 23 and 25 years of age, one mechanic aged 45 and one instructor aged 28 years. All the subjects were in excellent health with normal blood pressures. All work was done with an 800 Gm. load, a 6 cm. stroke and a rate of one contraction per second.

In March 1939, when the experiments began, the circulated (left) muscles were capable of only 300 to 900 Kg. cm. of work. After five weeks of training this ability was doubled or trebled and was still increasing rapidly. Each subject then took 60 Gm. of granular unflavored gelatin³ in fruit juice, soda water or plain water (divided into two doses) each day. This was the quantity of gelatin suggested and used by Ray.¹



Each point plotted is the total work in kilogram centimeters done by the extensor digitorum communis muscle on a given day. A, aminoacetic acid 15 Gm. daily; B, gelatin 60 Gm. daily. The points are connected by lines when the work days follow one another immediately. When work was not done on a particular day, no point is plotted and the line is interrupted. When a subject had to be absent more than two days, a portable ergograph was used each day to maintain training but no point was plotted on the graph. Both subjects had trained their muscles by daily work for more than six months before this graph begins. A fixed rate of work was obtained by using a constant load (1,400 Gm. on circulated muscles, 1,100 Gm. on ischemic muscles), a constant stroke of 6 cm., a constant rate of one stroke per second. Thus the essential variable is the time the subject can continue to work.

Two of the medical students were forced to discontinue gelatin within ten days, owing to apparent gastrointestinal intolerance. The complaint was nausea and a sensation of distention. The remaining four subjects continued the regimen for from twenty-one to thirty-one days. All six subjects continued working daily.

During the gelatin period the ability of all six circulated muscles continued to increase markedly. By the end of May, four weeks after all gelatin was stopped, each of the subjects was able to carry the 800 Gm. load for an indefinite period without fatigue (i. e. steady state). The training during the ingestion of gelatin was indistinguishable from that which occurred before the gelatin or after the gelatin was discontinued.

The ischemic (right) muscle in each case reached maximum ability after three or four weeks of daily work. It showed no further change in its ability (from 200 to 600 Kg. cm.) either as a result of daily work or as a result of the ingestion of gelatin.

The conclusions derived from this group of experiments were that:

1. Gelatin had no influence on the ability of human muscle working without blood supply.

2. No improvement in training of the circulated muscles was effected by gelatin. This did not prove that gelatin had no effect, as the muscles might have been training so rapidly that the effect of the gelatin would not have been visible.

3. The omission of gelatin from the daily regimen did not decrease the ability of those muscles which had been receiving it.

The second group of experiments was to determine what effect gelatin would have on the thoroughly trained muscle. Only two subjects (mechanic and instructor) were available continuously for the full year required for thorough training. These continued to work daily, using a load of 1,100 Gm. on both the circulated and the ischemic muscles. By the end of September and October respectively the ability of the circulated muscle had mounted from 800 to 1,100 Kg. cm. in June to 2,000 to 4,000 Kg. cm. or very close to steady state ability. The load was therefore increased again, this time on the circulated muscle alone, to 1,400 Gm. The ischemic muscles continued to work with a load of 1,100 Gm. The accompanying graph shows the entire subsequent course.

As can be noted, the ability of both the circulated and the ischemic muscles remained virtually constant for the first three months. Aminoacetic acid⁴ 15 Gm. a day was then ingested by each subject for thirty days. This amount was used because it approximates the aminoacetic acid present in 60 Gm. of gelatin. As the graph shows, there was no improvement in work ability during or after the ingestion of aminoacetic acid. Also there was no decline in power after the aminoacetic acid was stopped.

After another two months had elapsed the subjects were given gelatin⁵ again at the rate of 60 Gm. a day. After forty-two days on this regimen each subject had taken about 5 pounds of gelatin. The graph shows that neither the circulated nor the ischemic muscles showed any improvement during the ingestion or any decrease of ability after the gelatin was discontinued.

COMMENT

The obvious criticism of these experiments is that experimental work on only two subjects is not often acceptable. It must be remembered, however, that the data from one well trained muscle are more apt to be valid than the data from a dozen incompletely trained ones. Unfortunately, it is difficult to find subjects who are willing to train their muscles by daily work over a period of many months. The total data here presented show that in six trials the ability of the ischemic human muscle was uninfluenced by the ingestion of gelatin. This is probably a measure of the inherent ability of the neuromuscular unit itself irrespective of changes in the circulation. The data show that in six trials no decrease in ability attended the withdrawal of gelatin. Ray reported that the withdrawal was accompanied by a decrease in the summated ability of the many muscles used in operating a bicycle ergometer. The data show conclusively in two thoroughly trained subjects that the ability of the single circulated muscle was not increased by the ingestion of gelatin. This is

4. Glycocoll-Squibb was the aminoacetic acid used in this experiment.

5. Knox's unflavored "sparkling" gelatin was purchased for this purpose from a local distributor.

3. Swift's "Velvetex" gelatin, purchased from the local office of Swift & Co.

probably a measure of the ability of the combined neuromuscular and cardiovascular systems.

Most experiments dealing with voluntary fatigue of human muscles are open to the criticism that psychic changes can affect them. Is it probable that the subjects used were biased and consciously or unconsciously decreased their effort during the ingestion of gelatin? When a subject works as hard as he can, though only with a single muscle, certain changes occur. The blood pressure rises markedly, the face flushes and the jaw sets, and new associated movements occur and spread with the rise of the effort required to keep going. Such signs were always seen in these experiments. On a number of occasions the blood pressure was taken on the free arm during the work bout. An increase of 60 to 80 mm. of mercury systolic pressure was always found toward the end of the work. I have no doubt that each of the subjects made the maximum effort of which he was capable on every work occasion.

What influence do the present data have on the hypothesis that gelatin will postpone the occurrence of fatigue in work involving the whole body of normal persons? It is conceivable, though unlikely, that the ability of a single muscle might be differently affected by a given procedure than the ability of the body as a whole. However, the only objective data supporting the increased work ability in normal persons due to gelatin are those of Ray and his co-workers.¹ These authors trained their subjects for only two to four weeks before starting the gelatin. They found the gelatin effective only in male subjects and reported a decrease in work ability within ten days after the ingestion of gelatin stopped. Hellebrandt, Rork and Brogdon⁶ tested the influence of gelatin on the ability of female subjects by essentially the same method as that used by Ray. The Wisconsin investigators found no increase in the ability of their women subjects but they pointed out that their subjects could easily maintain a work output two or three times the maximum attained by Ray's male subjects; that the curves presented by Ray could be explained by the process of training without any action of gelatin. Ray's subjects were obviously incompletely trained. They were working daily to complete bodily fatigue. It is unlikely that such fatigue is completely overcome in twenty-four hours. Thus two simultaneous processes might be occurring in these subjects, training tending to increase the work ability and accumulating fatigue (overexercising) tending to decrease the work ability. At first the former process might predominate and ability increase. Later, a plateau might occur and later still staleness would predominate and the work ability decrease. If the gelatin was administered early and discontinued as the second process gains dominance, a curve such as Ray's would result. While all this is theoretical it makes even more imperative the statement of the Council on Foods:⁷ "It should be obvious that observations such as those reported [by Ray, Taylor and Johnson] on six men cannot be applied to all men until experimental confirmation is available from other laboratories."

The failure of aminoacetic acid to influence the work ability of the two thoroughly trained subjects suggests that the mechanism which makes aminoacetic acid effective in myasthenia gravis does not operate in normal

subjects. Since the average American dietary of protein is usually quite adequate, there is no reason to suppose that a supplement of the amino acid aminoacetic acid would be required for efficient function in normal persons.

SUMMARY

In two subjects trained for one year, neither aminoacetic acid 15 Gm. a day for thirty days nor Gelatin (Knox) 60 Gm. a day for forty days increased the work ability of the extensor digitorum communis muscles working with or without blood supply.

In four subjects in the midst of their training period the ingestion of gelatin for from twenty to thirty days produced no obvious difference between the rate of training of those taking gelatin and the rate of training of controls without gelatin.

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Clinical Notes, Suggestions and New Instruments

AN UNUSUAL CASE OF ROCKY MOUNTAIN SPOTTED FEVER IN SOUTHEASTERN PENNSYLVANIA

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The fact that the disease entity with the geographic name of Rocky Mountain spotted fever is appearing with greater frequency in the East is not as well known as the many recent reports would indicate. It was only in 1930 that research workers of the Public Health Service discovered that this disease was present in the states of the Atlantic seaboard. Since then many reports have appeared in the literature describing the epidemiology and clinical manifestations as they appear in the East. Rumreich,¹ Richards,² Crutcher,³ Litterer,⁴ Caton,⁵ Montz,⁶ Parker,⁷ Baker,⁸ Pincoffs and Shaw,⁹ Carey and Duncan,¹⁰ Hampton and Eubank,¹¹ Flippen¹² and many other investigators have conclusively shown that the presence of Rocky Mountain spotted fever in the East is on the increase and that the type as seen in the Rocky Mountain region is identical with that seen along the Eastern seaboard. However, when an isolated case does appear it always represents a considerable diagnostic problem, particularly if it is the first to be seen in the community in which it arises. I therefore felt that the report of the following case would be of interest, first as showing the diagnostic difficulties in a community in southeastern Pennsylvania which hitherto had been free from Rocky Mountain spotted fever, and second because of the occurrence of two features that Dyer¹³ considered to be most unusual—the month (December) in which the infection was contracted and a relapse that occurred one month after the symptoms of the original infection had completely subsided.

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8. Baker, G. E.: Rocky Mountain Spotted Fever with Reference to Prevention, Recognition and Treatment, *Rocky Mountain M. J.* **35**: 36 (Jan.) 1938.
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10. Carey, L. S., and Duncan, G. G.: Rocky Mountain Spotted Fever in the East, *J. A. M. A.* **110**: 175 (Jan. 15) 1938.
11. Hampton, B. C., and Eubank, H. G.: Rocky Mountain Spotted Fever: Geographical and Seasonal Prevalence, Case Fatality and Preventive Measures, *Pub. Health Rep.* **53**: 984 (June 17) 1938.
12. Flippen, H. F.: Rocky Mountain Spotted Fever in Pennsylvania, *Am. J. M. Sc.* **194**: 685-689 (May) 1936.
13. Dyer, R. E.: Chief, Division of Infectious Diseases, U. S. Public Health Service: Personal communication to the author.

REPORT OF CASE

F. S., a white man aged 45, admitted to the York Hospital Dec. 9, 1938, complained of severe headache, fever and nausea. Four days before admission the patient awakened with an excruciating frontal headache, aching pains in the back and legs and marked nausea. His family physician was called and found a temperature of 102 F., a pulse rate of 82 and a respiratory rate of 20. The physical examination revealed no gross abnormality. The headache increased in intensity, requiring the use of morphine; the nausea developed into continuous vomiting and he was sent to the hospital with the tentative diagnosis of typhoid or encephalitis.

The past medical history and the family history were of no particular relevance.

The patient was robust. On physical examination he was dull and drowsy and answered questions irrationally. He was very toxic—coated tongue, foul breath, hot skin. The temperature was 104 F., the pulse rate 102, the respiratory rate 26 and the blood pressure 130 systolic, 76 diastolic. The heart and lungs were normal; no masses were palpable in the abdomen and there was no adenopathy. The neurologic survey was negative.

December 9 the hemoglobin content was 13 Gm., red blood cells numbered 4,000,000, white blood cells 5,800 with a differential count: segmented neutrophils 34 per cent, nonsegmented neutrophils 29 per cent, small lymphocytes 25 per cent, large lymphocytes 1 per cent and monocytes 11 per cent. Analysis of the urine was negative for albumin and sugar. There was no microscopic abnormality. The Kahn reaction was negative.

December 10 the Widal test and agglutination tests for undulant fever and tularemia agglutination were negative. The spinal fluid was clear and colorless, with a pressure of 14 mm. No cells were present. Tests for globulin were negative. Sugar was 55 mg. per hundred cubic centimeters. The result of the mastic test was 00000. The Kahn reaction was negative. Blood cultures yielded no growth (ten days' incubation). Examination of the stool was negative for the typhoid-paratyphoid-dysentery and the gram-positive cocci group. Examination of the urine was negative for the typhoid-paratyphoid-dysentery group.

Four days after his admission the diagnosis was still most uncertain. The continuously high temperature (average of 104 F.) and the comparatively slow pulse (average of 102), the prostration, the delirium and the depression suggested typhoid; but all agglutination tests were negative and no organisms were found in the stool or urine. The severe headache, the nausea and vomiting, the moderate rigidity of the muscles of the neck suggested meningitis or encephalitis, but the normal spinal fluid denied that diagnosis. A few days after his arrival in the hospital a hacking cough developed and scattered rales were heard throughout the chest. Two sputum examinations revealed the presence of pneumococcus type VI and many gram-negative bacilli of *Bacillus influenzae* morphology. X-ray examination of the chest showed no areas of consolidation and physical signs of pneumonia were absent. However, at that time the diagnosis of a virulent type of influenza could not be eliminated. Also tularemia, undulant fever and the typhoid group were still under consideration, in spite of repeated negative agglutination studies.

On December 14, five days after his admission and about nine days after the onset, the first clue to the actual diagnosis was noted. A macular, red, pinpoint eruption was observed on the abdomen. By the next day this rash had spread to his legs, arms, back, palms of his hands and soles of his feet. A few lesions were seen on the roof of his mouth. The color at first disappeared on pressure but later did not. Successive crops of macules appeared and the earlier lesions became darker. Small hemorrhagic areas developed particularly around his ankles. With the appearance of the eruption his symptoms became intensified. Fever rose to 105 F. (axillary), stupor was more pronounced, intense photophobia and conjunctivitis appeared and the spleen became tender and palpable. Retention of urine occurred and repeated catheterizations were necessary.

With the appearance of the eruption the diagnosis was confined to typhus fever or Rocky Mountain spotted fever. A specimen of blood was sent to the Pennsylvania department of health laboratories and the agglutination against *Bacillus proteus* X₁₉ was positive in a titer of 1:2,560. Another specimen

confirmed this finding. The positive Weil-Felix reaction confirmed the diagnosis of a rickettsial infection but did not differentiate between typhus fever and Rocky Mountain spotted fever. The clinical picture also was of no help in making this differentiation. According to Caton,⁵ the temperature runs higher and the disease lasts longer in Rocky Mountain spotted fever. In typhus fever the rash appears first on the chest and abdomen, in Rocky Mountain spotted fever first on the ankles and wrists. But these points are of little significance in an isolated sporadic case and of but little aid in making the diagnosis. It was not until several months after the patient had recovered, when I sent a specimen of his serum to Dr. R. E. Dyer of the United States Public Health Service for protection tests, that the final diagnosis was made. Dr. Dyer reported that the completed protection tests in guinea pigs indicated protection against Rocky Mountain spotted fever.

After the eruption had run its course the clinical picture took a turn for the better. His headache lessened, his temperature declined by lysis and his consciousness improved. Throughout the course of the illness the treatment was simply symptomatic, the most important factor being good nursing care. After his temperature was normal for one week he was discharged on December 29, after a stay of twenty-three days in the hospital. On Jan. 25, 1939, following a period of three weeks during which his temperature was normal and he felt perfectly well, his headache returned and a high fever developed. No rash appeared. Headache, fever, chills and malaise continued for two weeks and then left him with no sequelae. He has been well ever since and has continued his usual occupation in very good physical condition.

COMMENTS

This case was most intriguing in many respects. The differential diagnosis of an unknown fever is always an interesting procedure. After the diagnosis had been made, the first of its kind in York County, the question of origin deserves consideration. Repeated questioning gave no history of a known tick bite. About a week before the onset he had been hunting in the woods close to the Maryland state line, but the tick season in that region persists only from May to October and the eight cases reported by Pincoffs and Shaw⁹ occurred only during that interval. Hampton and Eubank¹¹ point out that in the Atlantic states the incidence begins in May, reaches the peak in July, continues though declines definitely in August and drops abruptly in September and October. The occurrence of a case in December is decidedly unusual. The patient's occupation as a railway station agent required him to handle several shipments of undressed furs about a week before the onset of the fever and headache. Sedlacek¹⁴ reported the case of a meat packer who during the course of his work had to pass hides which were hung from the ceiling of a room. On his way home one evening he felt a bite on his neck and removed a tick. He subsequently contracted Rocky Mountain spotted fever. My patient has no recollection of a tick bite or so definite a source, but the possibility of the furs he handled containing the vector may be one explanation for the source of his infection. The relapse occurring about three weeks after the subsidence of all symptoms is rather unusual. For two weeks it seemed that the whole clinical picture had returned with the exception of the eruption and urinary retention. In a rather thorough survey of the literature I could find no other account of such a relapse.

CONCLUSIONS

A case of Rocky Mountain spotted fever which occurred in eastern Pennsylvania is unusual because of its onset in December and because of the occurrence of a relapse three weeks after the subsidence of all symptoms.

The name Rocky Mountain spotted fever is a suggestive misnomer, for that disease is now endemic along the whole Eastern seaboard and is by no means limited to the Rocky Mountain region. In the diagnosis of the problem of the unknown fever this disease should be kept in mind, and the value of the Weil-Felix and protection tests should be emphasized.

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Special Article

CONTRIBUTIONS OF THE WORLD WAR TO THE ADVANCEMENT OF MEDICINE

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In Flanders' fields the poppies blow
Between the crosses, row on row,
That mark our place; and in the sky
The larks, still bravely singing, fly
Scarce heard amid the guns below.

So wrote Major John McCrae, a medical officer of the Canadian army, at his dressing station during a lull in the hottest phase of the second battle of Ypres in 1915.¹

Little did he dream, as he created this immortal poem, that it would be cherished as the World War's greatest contribution to poetry. Nor did the harassed people of that day realize that the war would contribute substantially to the advancement of medicine. They were more concerned with what medicine could contribute to the war.

More than sixty million men were mobilized in the sixteen belligerent nations during the World War. About twenty million lives were sacrificed as a direct or indirect result of the war. About ten million soldiers and sailors were killed in action or died from wounds or disease. Approximately twenty million were wounded and nearly seven million were listed as missing or prisoners. Excluding the heavy casualties suffered by civilian populations, more than thirty-four million men were killed in action, died of wounds or disease, were wounded or were missing in action.²

With these appalling statistics in mind, it seems incongruous that the holocaust of 1914-1918 could offer any contributions to the advancement of medicine. Nevertheless, out of the throes of this ghastly war came certain vital contributions to human welfare.

Acknowledging the stupendous tragedy of the war, I will attempt to portray some of the benefits that have arisen from the mud and blood of those hectic years. Only such contributions as have furthered the advancement of medicine will be discussed.

The literature from which this essay is compressed is rich with facts concerning the effects of the great struggle on medicine. The war experiences of distinguished medical leaders have brought forth opinions and conclusions that may now be visualized in the mellow light of elapsed years.

War, whatever its faults may be, invariably serves as a stimulus.³ When the institutions, the freedom, the wealth, the health and the very lives of a people are jeopardized by destructive forces from without, the primal instinct of self preservation becomes a spur to endeavor and accomplishment. Medicine, unless overwhelmed by disaster, is bound to advance more rapidly under the stimulus of war.⁴

During the World War, great nations found themselves in danger of annihilation. Despite terrific losses, the will to survive and triumph promoted progress and accomplishment in all fields. This stimulus produced unprecedented efforts on behalf of the wounded soldier, caused an acceleration of medical achievement and resulted in contributions which tended to offset or compensate for the great loss of life and the economic cost of the war. The destruction wrought was, therefore, an impetus to progress—a stimulus to constructive activities.⁵

The potent but intangible stimulus of this colossal war was an important factor in producing definite contributions to the progress of medicine. These contributions will be considered under the following general headings.

1. Medical organization, education and literature.
2. Surgery and its related specialties.
3. Internal medicine and its related specialties.
4. Physical therapy, occupational therapy and roentgenology.
5. Medical advances in combating the ill effects of chemical agents.
6. Preventive medicine, public health and sanitation.
7. Medical supplies and equipment.

MEDICAL ORGANIZATION, EDUCATION AND LITERATURE

During the World War the best medical men of the time were drawn into the maelstrom of kaleidoscopic events. In each of the belligerent countries these men became organized, with a common purpose.

The internist Dr. Harlow Brooks⁶ spoke of the medical men of the United States as follows: "They were the first of the American Army to enter France and Belgium. The Medical Department was the first to be under fire, the first to suffer casualties and the first to receive death at the hands of the enemy."

In all the warring nations young doctors fresh from school, mature general practitioners and specialists in all branches of medical science were regimented to care for the sick and wounded, prevent disease, supervise sanitation and in various other ways assist in the conservation of the fighting strength of more than sixty million mobilized men. Cohesion, cooperation and team work developed on a greater scale than ever before in the history of medicine.

The best of the medical world were among the first to offer their services. Many of them were dumped unceremoniously into the seething cauldron of unclassified medical officer personnel. Like eggs, they were scrambled together. Many sizzled with righteous indignation at what seemed to be military inefficiency and lack of coordination. These splendid professional men were soon trained to understand and tolerate the red tape and apparent inconsistencies of military life. Their progress toward organized efficiency was essentially along the lines of military team cooperation. Group practice, as is known today, was thus encouraged as the result of the exigencies of war. This development of group medical practice, without displacement of the general practitioner, was an important advance in medicine and an outgrowth of the World War.⁷

Experiences in this war demonstrated the desirability of specialization in various branches of medical science

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6. Brooks, Harlow: The Lessons of the World War for the Internist, *Illinois M. J.* 40: 37 (July), 81 (Aug.), 181 (Sept.) 1921.

7. Butler, E. F.: Influences of the World War on the Development of Civil Practice, *Mil. Surgeon* 51: 494 (Nov.) 1922.

and showed conclusively that the superman of medicine who was presumably well qualified in all fields of medicine was no more than a myth—an unattainable ideal. As a result of lessons taught by the war, civilian medical practice became enriched by the sturdy growth of specialization. Likewise medicomilitary policy swung away from prewar concepts and leaned toward the idea of special training. Keen minds realized that only deterioration could result from any policy which ignored specialization. The day had long since passed when even the most brilliant medical officer could assimilate the requisite knowledge to perform satisfactorily all the duties which might be required of him. Medical knowledge had become too voluminous.⁸ There arose a school of thought in the Medical Department of the Army that medical officers should not all be obliged to devote their careers to learning everything and excelling in nothing. It was recognized that only by specialization could the highest professional ability be attained.

In the United States Army, after the war, Surgeon General Ireland and his advisers were quick to see this and group practice with specialization was encouraged. This policy was in keeping with the postwar trend in civil practice and it increased the professional prestige and efficiency of the Army Medical Corps tremendously.⁹

In many countries the records of physical examinations of World War conscripts comprise a vast reservoir of statistical data which are of value in studying the incidence of various physical defections in different age groups.¹⁰ There has arisen, as a contribution of the war, an added interest in periodic physical examinations, an added interest in raising the standards of medical education and a popular demand for increased facilities for postgraduate medical training.¹¹

World War contacts and problems promoted a better understanding and cooperation between Regular Army, Navy, National Guard and Reserve medical officers in America and bridged, in the space of a few years, the gap of intolerance, jealousy and distrust which had hitherto hindered medicomilitary progress. This friendly cohesion between various medical groups occurred also in other nations and may be considered an important stride in the march of military medicine, a boon to the federal services and a boost to medical science. In the field of military medicine the World War also brought to all nations a realization of the need for medicomilitary preparedness,¹² including personnel procurement and classification, training, medical supply and medical mobilization plans.¹³

It is true that during the war many medical men were diverted from important peacetime research and practice. But others were pulled out of ruts and dragged from the mire of professional stagnation. Through wartime contacts, responsibilities and experiences they envisaged new and greater fields of endeavor. Many acquired a broadness of perspective that could never have developed in the course of a peacetime career.¹⁴

A wealth of medical literature based on experiences of medical men during the World War has accumulated, thanks to those who were not too inarticulate or too reticent to publish facts, impressions and helpful hints gleaned from their service in uniform. This was facilitated by the organization of professional groups such as the Medical Research Committee of the American Red Cross in France.¹⁵ This committee was composed of members of the Red Cross Commission and of the United States Army Medical Corps. It was appointed for the purpose of stimulating research and aiding in the distribution of the medical information acquired by America's allies during the first years of the war.

Chemists, physiologists, bacteriologists, biologists and pathologists were brought into intimate association with practical clinical problems. The clinical and pathologic conference as an educational medium for interchange of professional knowledge became more widespread as a result of the popularity of such conferences during and immediately after the war.

In addition to showing the need for specialization, the war broadened tremendously the point of view of the specialist. This was accomplished by his close association with other branches of medical work under the stress and strain of fulfilling a great common mission.

In addition to numerous fragmentary writings of educational value, the World War has produced in documentary form a comprehensive record of the United States Army Medical Department activities during that period. These fifteen volumes "The Medical Department of the United States Army in the World War," compiled from records in the Surgeon General's Office¹⁶ under the direction of Major General Merritt W. Ireland, is the most complete chronicle of war medical activities in the history of the world. Other countries, to a lesser degree, have preserved documentary details of their medical activities during this great conflict.

A large section of the Army Medical Museum in Washington, D. C., is filled with specimens acquired during and as a result of the war. These specimens of war pathology are of considerable educational value. Their preservation and display are of real worth to the medical world.

The organized development of public health nursing on a more comprehensive scale was hastened by the war. The value of the nursing profession was more widely recognized and popularized. Nursing education and activities expanded to an unprecedented degree.¹⁷

SURGERY AND ITS RELATED SPECIALTIES

Dr. George Crile¹⁸ in 1920 made the following statement concerning the clinical material created by the World War and its effect on surgical advancement: "So vast was the field that in traumatic surgery the concentrated and accumulated experience of this brief period was greater than the experience along the same lines during the past one hundred years. It follows that during those months many new chapters were opened, some were closed and some discarded, while some were completed and their subject matter stands to be passed on to the benefit of civilian practice."

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16. *The Medical Department of the United States Army in the World War* (Fifteen volumes, published by the War Department, U. S. Govt. Printing Office).

17. Kerr, J. W.: *Some Influences of the World War on the Future of National Health*, Mil. Surgeon 49:125 (Aug.) 1921.

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Improved treatment of wounds stands out as one of several important advances in surgery contributed by the World War.¹⁹ Excision of wounds with primary closure was developed. Débridement, followed by disinfectant irrigation with the Carrel-Dakin technic and delayed closure, was originated and proved highly successful. The war taught the importance of immobilization of wounds of the soft tissues, even when no fractures coexisted. It taught that primary suture is the ideal to be carried out when possible; that delayed primary suture or early secondary resuture should be used when primary suture is impracticable.²⁰

One of the valuable lessons of war surgery was that bacteria of almost any variety can be dormant in healed or healing wounds and may, with slight provocation, cause recurring infection.

Much progress was made through trial and error experimentation concerning the disinfectant qualities of dyes and chlorine preparations.²¹ Of the surgical antiseptics developed by the war, Dakin's solution (diluted solution of sodium hypochlorite) is the most notable. Acriflavine, developed by the British, has also proved to be of considerable value, as has dichloramine-T.

Few will dispute the advances made in orthopedics during the war. Improvements in bone and joint surgery, especially in the treatment of infected joints, bone grafting and amputations, were notable.²² Standardization of, and dissemination of, knowledge concerning the skeletal splints and proper management of fracture cases were accomplished. The names of Blake, Osgood, Allison, Keller, Kirk and others will be remembered in this connection.

World War experience with fractures²³ showed that any method which compressed the part and impeded circulation interfered with the defense against infection, which in turn meant delayed healing. This led to the elimination of the coaptation splint and the substitution of immobilization by fixation with traction. The Balkan frame found its place, and other appurtenances furthering the comfort and rehabilitation of the orthopedic patient were devised. The war brought forth improved prosthetic appliances such as artificial limbs, supporting jackets, belts and braces and showed the need for orthopedic shops at hospitals caring for orthopedic patients.

The radical advance in the treatment of septic arthritis, introduced by Wilms, a Belgian surgeon, during the war, demonstrated the value of free drainage and active motion of infected joints. This was a revolutionary procedure which prevented and will continue to prevent thousands of stiff joints.

The high incidence of "trench foot" increased our knowledge of the damaging effects of prolonged exposure of the extremities to dampness, cold, tight leggings and ill fitting footwear.

A World War observation of little significance at the time led in later years to the development of a unique method of attacking the discouraging problem of chronic osteomyelitis. Dr. William Baer, an orthopedic surgeon of Baltimore, was impressed during his service in France with the clinical paradox presented by maggot-

infested wounds.²⁴ He was puzzled when several soldiers who had lain wounded on the battlefield for a number of days with extensive necrotic wounds were brought to his hospital in surprisingly good condition. He found the wounds infested with maggots, but he was amazed to note that the maggots were cleaning up the necrotic flesh and promoting healing of the damaged tissue.

So strongly was Dr. Baer impressed by this observation that he conducted experiments after the war and found that he could hasten healing in many cases of chronic osteomyelitis which had resisted orthodox methods of treatment. His discovery was presented to the world, and now the raising of maggots for therapeutic purposes is a matter of fact. The happy results obtained by this seemingly abhorrent form of treatment have encouraged its use. But its rise to popularity is naturally slow, owing to the aesthetic considerations and the revulsion at deliberately infesting wounds with these repulsive scavengers of dead flesh.

The popular appeal for maggot therapy has not grown rapidly even though its proponents stress the cleanliness of the technic. The little larvae are reared under almost aseptic conditions, washed thoroughly and preserved in a weak solution of mercury bichloride, which does not seem to harm them. Their scavenger services are utilized, of course, only in conjunction with other surgical methods, including thorough débridement of all accessible necrosed or devitalized tissue.

Anesthesia received careful study and rose to a higher plane during the war.²⁵ The value of nitrous oxide became more widely recognized, and this gas was generally accepted as the anesthetic of choice. The usefulness of spinal block anesthesia was proved, and advances were made in the field of local anesthesia.

Collaboration between laboratory and surgical service was intensified and was a factor in the establishment of improved surgical methods.²⁶

Vascular surgery was enriched. Traumatic aneurysms and other injuries to blood vessels are now handled with greater skill as a result of the war. Knowledge of nerve surgery and tendon transplants increased.²⁷

Blood transfusion was simplified, its dangers determined and minimized, and its field of usefulness extended.²⁸ The prime lesson learned was that transfusion should be done early and not delayed until the condition of the patient became critical. A plan was evolved whereby blood could be grouped, withdrawn and kept sterile, so that at any time within two weeks it could be available for transfusion. When heavy battle casualties were anticipated, supplies of blood for transfusion could be prepared in advance and held in readiness.

Advances were made in the early recognition, control and treatment of wound tetanus. Substantial improvements in brain surgery were attained under the leadership of such skilled specialists as Harvey Cushing.

Modern thoracic surgery may be said to have had its birth during the war as a result of intensive efforts to save those who were victims of chest wounds and

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25. Banister, J. M.: The Immediate and Ultimate Results of the Great War in Their Relations to Medical and Surgical Practice and to the Matter of Disease Prevention, *Nebraska M. J.* 4: 123 (May) 1919.

26. De Kruif, P. H.: Experimental Research on Effect of Intravenous Injection of Gum Salt and Salt Solutions, *Ann. Surg.* 69: 297 (March) 1919.

27. Stookey, Byron: Surgical Consideration of Peripheral Nerve Injuries, *Surg., Gynec. & Obst.* 27: 363 (Oct.) 1918.

28. Primrose, Alexander: The Value of the Transfusion of Blood in the Treatment of the Wounded in War, *Ann. Surg.* 68: 118 (Aug.) 1918.

those who were stricken with empyema.²⁹ Not only was the subspecialty of thoracic surgery born, but it was fostered and grew with the skilful labors of such men as Yates, Lilienthal, Graham and Keller.³⁰ Patients with chronic chest suppuration, who prior to the war would have forfeited their lives, are now saved by radical thoracoplastic surgery. Furthermore, the war taught much concerning empyema.³¹ It taught the importance of differentiating streptococcic suppuration from other types of empyema. It taught the importance of early closed drainage in acute empyema. The old, generally accepted method of rib resection and open drainage had often led to chronic suppuration, protracted invalidism and death. Closed drainage of acute empyema now cures many cases, thereby obviating the necessity for open drainage and mutilating thoracoplastic procedures.³²

In dealing with abdominal wounds, surgeons learned the value of speed, large incisions to give visibility and accessibility, and accuracy.³³

Skin grafting operations, always delicate and uncertain, taxed the skill of surgeons during the World War to such an extent that improved techniques were developed. Skin grafting may now be attempted with far greater assurance of success than in the days prior to 1914.

In a substantial degree the World War contributed to the advancement of faciomaxillary and plastic surgery, under the leadership of Blair, Hayes, Hutchinson, Powers and others. It was largely due to the great wealth of clinical material, rather than to any revolutionary discoveries, that these advances were made.³⁴

The paraffin treatment of burns, although a comparatively modest contribution, at least deserves mention as a development of the war.

Surgery shares honors with medicine for the clarification of the nature and treatment of traumatic shock. The brilliant work of Cannon, Crile and Porter threw new light on the pathology, prevention and treatment of this grave condition.³⁵

INTERNAL MEDICINE AND ITS RELATED SPECIALTIES

Most of the medical men who responded to the call during the World War were qualified surgeons or appeared eager to demonstrate surgical ability. Internists were scarce, but, as the war emphasized the need for men trained in this field, greater interest was encouraged. This inevitably led to advancement of internal medicine as a specialty.

During the war, attention was directed to the importance of impaired function rather than to anatomic defects. Cognizance was taken of how a heart acted as well as how it sounded.³⁶ This growth in the physiologic concept of disease was prompted by the experience acquired by countless physical examinations of supposedly normal as well as defective men.

29. Lilienthal, Howard: *Surgical Treatment of Empyema of the Thorax*, Mil. Surgeon **44**: 582 (June) 1919.

30. Graham, E. A.: The Maximum Nonfatal Opening of the Chest Wall, J. A. M. A. **73**: 1934 (Dec. 27) 1919. Lilienthal, Howard: *Thoracic Injuries*, *ibid.* **72**: 839 (March 22) 1919.

31. Tuffier, T.: Treatment of Empyemas, *Presse méd.* **26**: 497 (Sept. 26) 1918.

32. The Medical Department of the United States Army in the World War, vol. 11, part 2, 1924, War Dept., U. S. Govt. Printing Office.

33. Deaver, J. B.: The Traumatic Abdomen, *Ann. Surg.* **68**: 275 (Sept.) 1918.

34. Roberts, J. B.: Improvements in Reconstructive Surgery of the Head, Surg., Gynec. & Obst. **27**: 369 (Oct.) 1918.

35. Bainbridge, W. S.: Report on Medical and Surgical Developments of the War, Special Number, Nav. M. Bull., January 1919.

36. Lian, Camille: Functional Cardiac Tests, *Ann. de méd.* **5**: 358 (Sept.) 1918.

The war taught much concerning food deficiency diseases.³⁷ Necessity and the specter of starvation stimulated research, and the minds of interested medical men were focused on the prevention and correction of those diseases. It is only since the war, and largely as a result of it, that the world has become "vitamin minded." Although much of the investigation of vitamins has been exploited by commercial firms and faddists, there has nevertheless been a high degree of scientific accomplishment in this field. Then too the food shortage of the Central Powers was a gigantic, involuntary experiment in undernutrition.³⁸ It demonstrated gruesomely the harmful effects of undernutrition as exemplified by the sharp increase in the tuberculosis rate and mortality. It also showed the beneficial effect of restricted dietaries in lessening the incidence of diabetes mellitus in the underfed countries.

The World War may not justly be held responsible for the pandemic of influenza which swept over the earth in 1917-1918. But it is logical to surmise that more powerful batteries of medical thought and coordinated action were turned on this disease because of the war.³⁹

Lethargic encephalitis appeared and demanded laboratory and clinical investigation which furthered knowledge of this dreaded malady.⁴⁰ Knowledge of the devastation caused by the streptococcus as a cause of pneumonia was acquired during the war.

The importance of measles as a serious disease as well as an epidemiologic problem was impressed on the medical profession.⁴¹ Likewise the comparatively low virulence, occurrence and contagion rate of scarlet fever were a revelation to many physicians.

The World War epidemics of cerebrospinal fever demonstrated that this disease is a septicemia before meningeal involvement becomes manifest.⁴² It was found that the best therapeutic results were obtained when antimeningococcus serum was given both intravenously and intraspinally. The results were shown to be better than when only the intraspinal administration of serum was employed.

Medical men with the world's military forces were organized in such a manner that they had the unusual opportunity of close professional liaison. They enjoyed diverse official and unofficial channels for dissemination of their individual and group experiences. Accumulated knowledge could be sorted, culled, concentrated and promulgated with greater facility throughout the medical world.⁴³

The doctors of that time were privileged to observe how the respiratory diseases created havoc in the crowded cantonments at home and in the concentration camps of the rear areas. They were able to make comparisons and especially noted the relative mildness of the epidemic in the front lines and in the areas where men who were hardened by outdoor work predominated. But they found that it was the outdoor life and lack of

37. Rockwood, P. R.: Lessons of Nutrition Derived from the Great War, Mil. Surgeon **56**: 385-413 (April) 1925.

38. Konrich: Nutrition During the World War and What It Taught Germany, München. med. Wchnschr. **81**: 1190-1195 (Aug. 3) 1934.

39. The Influenza Committee of the Advisory Board to the D. G. M. S., France: A Report on the Influenza Epidemic in the British Armies in France, 1918, Brit. M. J., Nov. 9, 1918.

40. Cruchet, R.: Origin of Epidemic Encephalomyelitis in War Zone in France, 1915, J. de méd. de Bordeaux **107**: 895-900 (Nov. 30) 1930.

41. The Medical Department of the United States Army in the World War, vol. 9, Communicable and Other Diseases, 1928.

42. Glover, J. A.: Prevention of Military Epidemics of Cerebrospinal Fever, Brit. M. J. **2**: 509 (Nov. 9) 1918.

43. Hurst, A. F.: *Medical Diseases of the War*, ed. 2, London, Edward Arnold, 1918.

crowding, rather than hardihood of youth, that minimized the spread of the infection in certain regions.⁴⁴

The retention of clinical cases under military control, where their records could be followed and results of various forms of therapy evaluated, afforded a better groundwork for an ultimate victory over the respiratory diseases than was possible in civil communities. It is true that no startling discoveries were made. But much investigative work was undertaken, and the slow advance was accomplished more by a process of elimination than by brilliant discovery.

The stimulus to scientific endeavor, born of this pandemic of influenza and intensified by its prevalence in the armies of the warring nations, resulted in slow but important gains against this and other infectious diseases.⁴⁵

Although influenza has not yet been conquered, the pneumococcic pneumonias have been tamed and classified, and potent therapeutic serums have been developed for a number of the common types.

Laboratory medicine was also called on to prepare an antitoxin against the fatal ravages of gas gangrene.⁴⁶ This was not accomplished until the latter part of the war, too late to be of widespread practical value to the wounded soldiers of that conflict. But this direct contribution of the World War has proved a godsend to thousands of sufferers since 1918 and, throughout the years to come, countless lives will be saved by this achievement of laboratory science. Medical men of eminence and many whose names are unsung aided in the bacteriologic investigation of gas gangrene and the development of an antitoxin.⁴⁷ Bull of Johns Hopkins and Paul De Kruif of the University of Michigan worked in America. Vincent, Strodel, Weinberg and Séguin in Europe were also notable investigators in this field.⁴⁸

"Trench mouth" became a frequent and troublesome affliction of soldiers during the World War. Its prevalence and its influence on the noneffective rate of troops resulted in laboratory studies which revealed its cause and means of prevention.⁴⁹ Further experimental research demonstrated effective drugs which could be used to destroy the Vincent spirochetes and fusiform bacilli. As a consequence there are now satisfactory therapeutic measures for combating Vincent's stomatitis ("trench mouth").

In the realm of cardiovascular diseases, great progress was made particularly in the recognition and spread of knowledge concerning the vague and nebulous functional disorders of the heart.⁵⁰ Vasmotor instability, effort syndrome, soldier's heart and neurocirculatory asthenia became common phrases in the medical wards, at sick call and with medical examining boards during and after the war. Less conspicuously the World War fostered our knowledge of rheumatic heart disease, syphilitic heart disease and bacterial endocarditis.

As the postwar years have unfolded, war veterans suffering degenerative diseases have flowed in increasing

number into government hospitals, affording hitherto unsurpassed opportunities for studying these diseases. The degenerative afflictions of middle life and older age groups most commonly encountered are the arteriosclerotic cardiovascular ailments. Spectacular and deadly in this group of diseases is coronary thrombosis. It is only since the war, and especially in the last decade, that the medical world has become "coronary conscious," following the pioneer work of Herrick in 1916.

The so-called war nephritis, of obscure etiology, led to extensive investigation of its cause and increased our medical knowledge of renal disease.

The work of Dr. Salmon with the war neuroses is notable. Exceptional opportunity arose for the study of neuropsychiatric diseases, particularly the functional nervous disorders.⁵¹ In this group fell the ill named "shell shock" and the ill famed twilight zone of neuropsychiatric diagnosis, in which malingerers, mental and moral defectives, conscientious objectors and unclassified degenerates sought refuge and safety.⁵²

Fever therapy was used for the first time as a therapeutic agent in the treatment of dementia paralytica during the World War. The blood of two malarial "shell shocked" German soldiers was injected into the veins of patients with the disease in an advanced form and produced encouraging results which led to further work along this line.

Minor mental deviations and endocrine disorders were studied more intensively because of the war and the clinical material which it furnished.⁵³ Studies pertaining to all factors which might influence troop strength and morale were encouraged.

Aircraft development was given a tremendous boost by the World War, and with it came advances in medical knowledge which gave sanction to the birth and growth of aviation medicine.⁵⁴

PHYSICAL THERAPY, OCCUPATIONAL THERAPY AND ROENTGENOLOGY

Physical therapy and occupational therapy formerly were looked on with more or less suspicion and disdain. They were rated by many physicians as bastard offspring of legitimate medicine. But they proved themselves entitled to worthier consideration during the crippling years of the war. These frail and undernourished branches of medicine thrived during the rehabilitation era that followed the armistice.⁵⁵ They have established their usefulness, especially as adjuncts to orthopedics and neuropsychiatry, in hospitals throughout the world.

The most important benefit brought forth in roentgenology by the World War was the perfection of a highly satisfactory method of localization of foreign bodies.⁵⁶ This seemingly small contribution has been of great practical value. One cannot estimate the surgical shock that has been prevented or the number of lives saved by this contribution to medical science.

44. Brooks, W. A.: The Open Air Treatment of Influenza, *Am. J. Pub. Health* 8:746 (Oct.) 1918.

45. Symmers, Douglas: Pathologic Similarity Between Pneumonia, Rubicose Plaque and Pandemic Influenza, *J. A. M. A.* 71:1482 (Nov. 2) 1918.

46. Nexon, M.: Experimental Gas Gangrene: The Protection Afforded by Various Anti-erna and Anti-Sera Mixtures, *War Medicine* 2:1514-1517.

47. De Kruif, P. H.: Toxin of *Bacillus Welchii*, *J. Infect. Dis.* 21:580 (Dec.) 1917.

48. Iven, F.: The Prevention and Curative Treatment of Gas Gangrene by Mixed Serums, *Brit. M. J.* 2:425 (Oct. 19) 1918.

49. Barker, L. F., and Miller, S. R.: Perforating Ulcer of the Hard Palate Resembling Tertiary Syphilis but Due to a Fusiform Invasion (So-Called Vincent's Angina), *J. A. M. A.* 71:793 (Sept. 7) 1918.

50. Warfield, L. M., and Smith, F. M.: Studies on Irritable Heart, *J. A. M. A.* 71:1815 (Nov. 30) 1918.

51. Madigan, P. S.; Odom, C. C., and Porter, W. C.: Psychoneuroses of War: Immediate and Remote Effects of War on the Nervous System in Combatants and Noncombatants, *Cong. internat. de méd. et de pharm. mil.* 1:245-272, 1931.

52. The Medical Department of the United States Army in the World War, vol. 10. Neuropsychiatry, 1929.

53. Bonhoeffer, K.: Psychopathology and the World War, *München. med. Wehnschr.* 51:1212-1215 (Aug. 3) 1934.

54. Wilmer, W. H., and Berens, Conrad: The Effect of Altitude on Ocular Functions, *J. A. M. A.* 71:1394 (Oct. 26) 1918. Lewis, E. R.: Influence of Altitude on the Healing and Motion Sensing Apparatus of the Ear, *ibid.* 71:1398 (Oct. 26) 1918.

55. The Medical Department of the United States Army in the World War, vol. 13. Physical Reconstruction and Vocational Education, 1927.

56. McGrigor, D. B.: A Simple Method of X-Ray Localization, *J. Royal Army M. Corps*, September 1918.

MEDICAL ADVANCES IN COMBATING THE ILL EFFECTS OF CHEMICAL AGENTS

Chemical warfare, brewed in the laboratories of Germany, was voraciously lapped up by the famished dogs of war and belched forth in 1915 to strike terror and spread dismay among the Allies. Little did the horrified world of that day visualize the beneficent possibilities of this terrible weapon.

Contemporary with the development of chemical warfare agents came medical advances which gave protection from lethal gases.⁵⁷ These accomplishments in chemical warfare defense proved of paramount worth in war time. Necessity had once more become the mother of invention.

Perfection of defense against chemical agents has proved of value in civil industry as well as an adjunct in warfare. Investigation of toxic gases and other harmful chemical agents has focused attention on industrial hazards that had previously commanded scant attention.

Aside from benefits to industrial medicine, extensive laboratory investigation indicates that chemical warfare may be more humane than machine gun fire and high explosives.⁵⁸

Headed by Major General H. L. Gilchrist, an able medical officer whose administrative efficiency and experience in chemical warfare admirably fitted him for its chief, the Chemical Warfare Service of the United States Army carried on extensive research following the war. The laboratories of this service have supported the World War casualty records in acclaiming chemical warfare more humane than warfare which inflicts gunshot wounds.⁵⁹ The general public is slow in recognizing this fact, and many will doubtless refute the contention that chemical warfare has contributed to the advancement of medicine.

PREVENTIVE MEDICINE, PUBLIC HEALTH AND SANITATION

The great war, pregnant with strife and upheaval, delivered into the world an era of preventive medicine.

In 1914 it was discovered that botulism might be caused not only by contaminated meats but by infected vegetables which had been improperly canned.⁶⁰ Food shortage encouraged home canning. This directed attention to the potential danger of widespread outbreaks of botulism. The effects which serious outbreaks due to contaminated foodstuffs would have on military morale accelerated research and propagation of knowledge concerning this disease and its prevention.

While it cannot be said that the war contributed directly to the eradication of typhoid, dysentery, tetanus, meningitis or any of the infectious and contagious diseases, one important lesson was driven home. The war demonstrated beyond all doubt the efficacy of typhoid vaccine and tetanus antitoxin as prophylactic agents. It was possible to compare large groups of men who were vaccinated with large groups of men who were not vaccinated. The incidence of typhoid developing in those who had received protective vaccine was negligible and in striking contrast to the high incidence in armies in which such vaccination was not compulsory.⁶¹

Increased knowledge of the dangers of overcrowding and of the importance of isolating cases and segregating contacts exposed to meningitis, influenza and other infectious respiratory diseases was acquired during the war, when the importance of conservation of man power intensified efforts toward disease control. It was this mass demonstration of effective and ineffective control measures, and the spread of general knowledge among the public concerning effective control measures, which contributed to advancement in this field, rather than important new discoveries.⁶²

Standardized methods of controlling and treating venereal diseases were developed in most of the mobilized armies. These methods were later made applicable to the management of such diseases in civil life.⁶³ After the war, standardization of treatment was adopted throughout the world on a far greater scale than was in effect prior to the war. Likewise, measures aimed at control of the social diseases were promulgated. Educational programs to combat venereal infections were first encouraged in a large way during the World War.

The social and sanitary measures adopted for preventing venereal diseases inhibited the spread of these disabling afflictions among our troops. These measures, based not on sentimental or moral ideas but on a practical working plan, enormously increased the strength and efficiency of the American fighting forces.

The army's candid system of venereal disease control, developed during the World War, should be classed as an outstanding contribution to the advancement of preventive medicine.⁶⁴ Civilian populations throughout the world are now approaching the problem in somewhat the same manner. Enlightened public opinion now encourages educational and other practical control measures. To eliminate the fear and shame and vice consciousness which has become attached to the word "syphilis," Paul De Kruif goes so far as to advocate that it become divorced from loathsome thoughts and be made a cozy, fireside word: a word used in spelling bees and crossword puzzles.

Trench fever, a common disease of the World War, is rare today. Its disappearance is due largely to the improved sanitary knowledge which makes it possible to inhibit its development and prevent its spread. Its former importance can be realized when World War archives are consulted and reveal that at one time approximately 60 per cent of all hospital patients of the British Expeditionary Force were suffering from trench fever. One third of all the sickness in the British army during the World War is thought to have been caused by trench fever. Yet today this louse-borne scourge is scarcely heard of—a forgotten disease conquered as a result of the researches of the American Red Cross Trench Fever Commission.

The Report of the Trench Fever Commission of the American Red Cross Research Commission, published in 1917, is a medical classic of great scientific value and a comprehensive treatise of absorbing interest.⁶⁵

The intensive study and conquest of trench fever led to postwar research concerning other rickettsial diseases. This opened up for more careful clinical investigation the wide and thinly explored field of filtrable virus diseases. Subsequent accomplishments in this

57. Vedder, E. B.: *The Medical Aspects of Chemical Warfare*, Baltimore, Williams & Wilkins Company, 1925.

58. Gilchrist, H. L.: *Humanity of Chemical Warfare*, Mil. Surgeon 57: 529-538 (Nov.) 1925.

59. The Medical Department of the United States Army in the World War, vol. 14, *Medical Aspects of Gas Warfare*, 1926.

60. Dickson, E. C.: *Botulism*, J. A. M. A. 69: 966 (Sept. 22) 1918.

61. von Krehl, L.: *Infectious Diseases of the Typhoid Group in the Great War*, München. med. Wchnschr. 81: 1195-1196 (Aug. 3) 1934, and comment by Bohner, *ibid.* 81: 1355 (Aug. 31) 1934.

62. Bainbridge, W. S.: *War Time Lessons Applied to Peace Time Warfare*, U. S. Nav. M. Bull. 29: 608-614 (Oct.) 1931.

63. Irvine, H. G.: *Syphilis and Venereal Diseases as a Public Health Problem*, J. A. M. A. 71: 1029 (Sept. 23) 1918.

64. Pusey, W. A.: *Handling the Venereal Disease Problem in the U. S. Army in the Present Crisis*, J. A. M. A. 71: 1016 (Sept. 24) 1918.

65. Report of Commission of American Red Cross Research Committee: *Trench Fever*, New York, Oxford University Press, 1918.

field may be attributed in part to the wartime challenge of trench fever and the research prompted by this disease.

The prevalence of malaria and other protozoan diseases became a military problem of importance in Europe as well as in tropical and subtropical theaters of operation. Appreciable advance was made concerning epidemiology of protozoan infections.⁶⁶

As a result of the war and the acute problem facing European countries, unusual interest became centered in child welfare.⁶⁷ This interest was accentuated by realization that many of the numerous physical defects disclosed by military examining boards might have been prevented by intelligent thought on the subject of child conservation in the past. Sharing the problem of child welfare, pediatrics and public health pushed forward toward new heights.

The return of World War doctors to civil life, trained in sanitation, and the good effects of sanitary control impressed on the minds of the soldiers returning to peaceful pursuits were doubtless powerful factors favoring the future of preventive medicine.⁶⁸ The shortcomings of the past, with respect to hygiene, and the needs for the future were emphasized. The war fostered the propagation of general knowledge concerning sanitation and especially concerning the importance of sputum, excreta, flies, lice and other vermin in the spread of disease.⁶⁹

The education of the public in preventive medical measures is clearly exemplified by the campaign of the American Typhus Fever Commission in poverty-stricken, chaotic Serbia in 1919.

The widespread death-dealing epidemics of typhus fever in Serbia, Poland and Russia, conceived in the hellish poverty and filth of the latter months of the war, bore most bitter fruits in 1919 as an aftermath of the great conflict. Even this fearful disease scourge, viewed in the light of a later era, may be looked on as a blessing in disguise, for it inspired the United States government to send scientific aid and practical relief into Serbia and Poland.

When the large, well organized Typhus Fever Commission went into Serbia, it was given dictatorial powers by the Serbian government that it might save the stricken country. Had the people of Serbia been denied this outside aid, the great plague would have decimated their population, and the survivors would have been none the wiser.⁷⁰ Other epidemics would have followed, and superstitions and fatalistic philosophies would have continued to prevail, had not the American Typhus Fever Commission plunged into the fray and carried its magnificent educational program to successful completion. Due credit is given to the Serbian government for its wholehearted assistance, and to the people of Serbia for their cooperation and gratitude.

Under the heading of preventive medicine, it should be mentioned that submarine warfare and its problems focused medical attention on the dangers of subventila-

tion, the hazards of carbon monoxide and caisson disease. This aroused educational programs to prevent such conditions and led to developments in air conditioning.

The transportation of huge expeditionary forces by ship and train necessitated crowded accommodations and brought many sanitary defects sharply to the attention of responsible officers, whose objectives were the correction of sanitary errors when and if possible. The modern rat-proofing of ships, docks, warehouses and other buildings was promulgated by sanitary studies and experience gained largely from the World War.

There can be no doubt that progress in epidemiology was furthered by the war. That portion of Dr. Victor Vaughan's monumental three-volume work "Epidemiology and Public Health," dealing with meningitis, influenza and the respiratory diseases in general, is based largely on experiences of the World War.⁷¹ These notable volumes have received worldwide recognition as an authoritative reference work on epidemiology.⁷²

As a testimonial of the importance of preventive medicine as demonstrated during the World War, at least three great European powers, England, France and Italy, have each placed in their cabinets a minister of health.

MEDICAL SUPPLIES AND EQUIPMENT

The World War brought forth a greater standardization in medical supplies and equipment than had ever existed before. It created a demand for new and improved methods of manufacture, procurement and distribution.⁷³

Colonel (later Brigadier General) C. R. Darnall had some years earlier achieved a contribution to sanitary science the magnitude of which is scarcely yet realized, notably the purification of drinking water by liquid chlorination.⁷⁴ The practical application of his investigations and ingenious invention is now world wide in scope.⁷⁵ When the United States joined the Allies in 1917 he was selected to organize and administer the Division of Finance and Supply of the Medical Department of the Army. Under his judicious management more than \$350,000,000 worth of medical supplies and equipment were purchased and disbursed, with a smooth efficiency in startling contrast to the inadequate and chaotic medical supply administration of previous wars.⁷⁶

Occasional instances wherein American medical supplies and equipment were insufficient or lacking were invariably traced to exigencies of the service beyond the control of the Medical Department, such as delays incident to priority of manufacture or to priority of shipment accorded other war materials.

The splendid accomplishment of the Medical Supply Division not only resulted in a greater standardization of medical material but opened the way for further development and advance of American commercial research and manufacture of chemicals and drugs as well as other medical supplies and equipment. It uncov-

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68. Lambert, S. W.: What War Has Done for Medicine, *J. Florida M. A.* 4: 261 (March) 1918.

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70. Craig, C. M., and Fairley, N. H.: Typhus Fever (Observations on a Serological Test: Weil-Felix Reaction), *Lancet* 2: 385 (Sept. 21) 1918.

71. Vaughan, V. C.: *Epidemiology and Public Health*, St. Louis, C. V. Mosby Company, 1922.

72. Obituary: Victor Clarence Vaughan, 1851-1929, *Am. J. Pub. Health* 20: 53-55 (Jan.) 1930.

73. Moseley, G. V.: Industry and National Defense, *Mil. Surgeon* 68: 1 (Jan.), 346 (March), 478 (April) 1931.

74. Darnall, C. R.: The Purification of Water by Anhydrous Chlorine, *J. Am. Pub. Health A.* 1: 783 (Nov.) 1911.

75. Elms, J. W.: *Water Purification*, New York, McGraw-Hill Book Company, Inc., 1917, pp. 375-380.

76. The Medical Department of the United States Army in the World War, vol. 1, p. 227.

ered the need and established the groundwork for medical industrial mobilization planning.⁷⁷

As an outgrowth of experience gained during the war, a need was seen by the Medical Supply Division for protecting the interests of the government when contracting for the purchase of drugs and other material under the provisions of regulations requiring competitive bidding. Thus there was developed a testing laboratory at the Army Medical Supply Base at Brooklyn, which insures that drugs and other supplies come up to the standards specified in the purchase contracts. This has resulted in higher quality goods and has led to keener competition on the part of manufacturers. Dishonest bidders are more likely to become discouraged, eliminated and fall into disrepute.

World War experience with medical supplies in all the belligerent countries resulted in improvements which are a distinct contribution to the advancement of medicine.

SUMMARY

We are the dead. Short days ago
We lived, felt dawn, saw sunset glow,
Loved and were loved, and now we lie
In Flanders' fields.

Thus laboring under shell fire and in the blood of his dressing station on the Western Front did a Canadian army doctor lay bare his soul. And throughout the war-stricken world thousands on thousands of other weary doctors labored. The full extent of their accomplishments will never be known.

On the preceding pages are enumerated some of the contributions of the World War to the advancement of medicine. These may be briefly summarized as follows:

1. In the field of medical organization, education and literature the war contributed much to the advancement of medicine. The popularization of group medical practice was an immediate result of the war which showed the medical world the desirability of teamwork, specialization and logical division of labor. This has expedited professional work and has elevated the quality and efficiency of the service rendered. The examinations of conscripts focused public attention on both physical and mental unfitness and the medical-sociological problems incident thereto. The medical and military professions learned the value of cooperation in relation to any future mobilization.

2. In surgery and its related specialties, concrete progress was made as a result of the World War. The clinical material furnished by the war casualties gave impetus to improvements in surgical technic, increased surgical knowledge and improved methods of treatment of wounds. Débridement, the Carrel-Dakin technic, improved management of orthopedic cases, traumatic shock, chronic osteomyelitis, empyema, chest surgery, septic arthritis and blood vessel surgery are but a few of the outstanding achievements. The vast experience gained by all belligerent nations concerning traumatic surgery and the standardization of acceptable forms of treatment were important contributions to medicine.

3. In the realm of internal medicine and its related specialties, notable advance was made as a result of the war. Starving nations studied the science of nutrition and food deficiency diseases. Much investigation was stimulated, although slow progress was made, with the respiratory infections. An antitoxic serum for gas

gangrene was discovered. Increased knowledge was acquired concerning cardiology. Neuropsychiatry was spurred to new attainments. The need for better care of the permanent psychoses was emphasized. Trench mouth was conquered. The prevalent and puzzling disorder known as "war edema" resulted in studies which increased our knowledge of renal disease. Treatment of neurosyphilis with malaria inoculation was instituted.

4. Physical therapy and occupational therapy proved their worth and expanded into valuable adjuncts of such specialties as neuropsychiatry and orthopedics. Roentgenology during the World War was enriched by the perfection of a satisfactory method of localization of foreign bodies.

5. Chemical warfare promoted research and accomplishment in overcoming the ill effects of chemical agents. These contributions aided industrial medicine. Studies of the effects of chemical agents furnished valid evidence that chemical warfare is more humane than warfare which inflicts gunshot wounds.

6. Preventive medicine was elevated to a much higher plane of importance than it had previously occupied. The cause of trench fever, which made great inroads on the effective rate of troops in Europe, was discovered and its ravages controlled. The efficacy of typhoid vaccine and tetanus antitoxin was demonstrated on a grand scale. Standardized methods of controlling and treating venereal diseases were developed. The promulgation of general knowledge concerning sanitation was expanded and accelerated.⁷⁸

The great European epidemics of typhus fever, immediate aftermath of the World War, afforded opportunity for educational campaigns which did much to further the advancement of medicine not only in the stricken countries but throughout the world.

Advances in air conditioning and the propagation of knowledge concerning the dangers of carbon monoxide, subventilation and caisson disease resulted from problems raised by submarine warfare and from the manufacture and employment of munitions. Likewise, sanitary problems of the war stimulated improvements in sanitary devices and brought about the rat-proofing of ships, docks and warehouses. Maintenance of health during the war acquired a new, practical value, which called attention of intelligent people to the fact that it could also be of practical value in peace.

In general, a broad extension of clinical activities in the field of public health was brought about as a result of World War experience. The extraordinary advances in preventive medicine between the Spanish-American and the World War had practical application during the latter conflict. The value of these earlier accomplishments in the field of sanitation was clearly demonstrated between 1914 and 1918. Comparisons between armies which made full use of these earlier advances in preventive medicine and armies which failed to do so could be studied. The contrast was striking. Further progress in laboratory research and in the application of preventive medicine was thus encouraged. Investigators renewed their studies with enthusiasm, and knowledge became more widespread. The importance of sanitation and preventive medicine became more generally recognized.

7. Substantial improvements in the standardization, manufacture and distribution of drugs and other medical

77. Ashburn, P. M.: *A History of the Medical Department of the United States Army*, Boston, Houghton-Mifflin Company, 1929, pp. 308-309.

78. Downes, R. M.: *What Medicine Owes to War and What War Owes to Medicine*, J. Roy. Army M. Corps 67: 381 (Dec.) 1936.

supplies resulted from the World War. When shortage was threatened because of the war there was a stimulus to enter this manufacturing field. American commercial research and manufacture of chemicals, drugs and other medical supplies was encouraged. Improvements in quality of supplies was likewise stimulated by the creation of testing laboratories which discouraged dishonest bidders and purveyors of inferior goods.

CONCLUSIONS

That some good may come from all evil is no better illustrated than by the benefits to humanity that have arisen from the ashes of the World War.

The richest contributions of this great conflict to the advancement of medicine have not been new or revolutionary discoveries but standardization of procedure and equipment together with dissemination of knowledge based on war experience. As the years unfold, the light of knowledge increases and reveals more clearly how medicine has advanced through the storm and blood of the World War.

Many of the discernible and less abstract contributions have been enumerated and discussed in the foregoing pages. In addition to its concrete and tangible achievements, the World War contributed to the advancement of medicine by instilling into the profession a higher sense of duty and idealism, a stronger moral fiber and a deeper pride of constructive accomplishment.

Lieutenant William Fitzsimons, a young army medical officer, was the first American soldier killed in France after the United States entered the war. More than three thousand British medical officers made the supreme sacrifice, while more than twenty-three thousand British physicians were wounded in action. The staggering toll of medical officers of other nations who became casualties in the World War is mute tribute to their patriotism, fearlessness and unselfish devotion to the amelioration of human suffering. They were classed as "noncombatants," yet they displayed a courage and self sacrifice no less than that of their combatant brothers of the line, to whom they rendered such invaluable service.

What contributions of the World War are more constructive, more enduring and more of a boon to posterity than the contributions of wartime physicians to the advancement of medicine? Their loyal and efficient labors engendered an added esteem, prestige and respect for medicine.

We are forced to the conclusion that, as advances were made in the destructive mechanism of war, so also protective and constructive forces struggled for supremacy. Many of the beneficent achievements counterbalanced or outweighed the accomplishments of destructive agents. Many of these admirable contributions might never have come to light except through the darkness and despair of war.

When the medical men and women of the World War come to their journey's end, may their good work be carried on. And may this challenge of a Canadian Army surgeon live to inspire the countless millions yet unborn:

Take up our quarrel with the foe,
To you from failing hands we throw
The torch—be yours to hold it high.
If you break faith with us who die,
We shall not sleep, though poppies grow
In Flanders' fields.

Battle scarred, but enriched by its World War achievements, Medicine marches on.

Council on Pharmacy and Chemistry and Council on Physical Therapy

COUNCILS' COMMITTEE ON CONTRACEPTIVES

THE FOLLOWING WAS PREPARED FOR THE COUNCILS' COMMITTEE ON CONTRACEPTIVES BY GILBERT W. BEEBE AND CLARENCE J. GAMBLE, M.D. IN AUTHORIZING PUBLICATION OF THE REPORT THE COMMITTEE EXPRESSES ITS APPRECIATION TO THE AUTHORS OF THE PAPER FOR THEIR COOPERATIVE AID.

PAUL NICHOLAS LEECH, Secretary
COUNCIL ON PHARMACY AND CHEMISTRY.

HOWARD A. CARTER, Secretary
COUNCIL ON PHYSICAL THERAPY.

CLINICAL CONTRACEPTIVE RESULTS IN A SMALL SERIES OF PATIENTS

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NEW YORK

AND

CLARENCE J. GAMBLE, M.D.

MILTON, MASS.

In 1933 a metropolitan general hospital inaugurated a limited contraceptive service for obstetric patients. The department was not equipped to provide methods requiring individual fitting and believed that a simpler method might have wider acceptance than diaphragm and jelly and thus facilitate child spacing for a larger proportion of patients. Of the simple methods then available, jelly used alone seemed the most promising. A lactic acid jelly¹ was selected on the basis of apparently satisfactory clinical use elsewhere. This was offered to patients at cost, 20 cents for a tube of jelly and 10 cents for an applicator. In order that they might know of alternative and supplementary methods which might provide greater protection than jelly alone the patients were also given information on the greater effectiveness of condom plus jelly, on the low risk days of the menstrual cycle and on the location of an extra-mural clinic where a diaphragm might be fitted.

Two efforts at follow-up have been made in order to study the fertility of the patients thus advised. Both of these have been reported elsewhere;² the present paper being a summary of the second report, which gives in greater detail both the procedure and the results.

THE PATIENTS

The selection of the sample of 197 patients was such that all were white, of demonstrated fertility and possessed of sufficient interest in the control of their reproduction to purchase the supplies offered. The occupational distribution of the husbands, only 5 per cent of whom were unemployed at the second survey period, December 1936 to February 1937, shows that 14 per cent were clerical or white collar workers, 43 per cent skilled laborers or foremen, 40 per cent semi-skilled or unskilled laborers, and 3 per cent of unspeci-

From the National Committee on Maternal Health, Inc., 2 East One Hundred and Third Street, New York.

1. Lactikol B. The authors do not wish to imply that Lactikol B is the only preparation which would be expected to yield results commensurate with those reported here. The present active ingredients given by the manufacturer are 2 per cent lactic acid, 0.05 per cent oxyquinoline sulfate, 16 per cent glycerin, blended carbohydrate gum base. An initial pH of 3.1 and the presence of gum karaya and gum tragacanth have been reported by Leo Shedlovsky, Ph.D. (The Composition of Some Commercial Contraceptive Jellies, *J. Contraception* 4: 179-188 [Oct.] 1939.)
2. Gamble, C. J., and Beebe, G. W.: The Clinical Effectiveness of Lactic Acid Jelly as a Contraceptive. *Am. J. M. Sc.* 104: 79-84 (July) 1937. Beebe, G. W., and Gamble, C. J.: The Effect of Contraception on Human Fertility, *Human Biology* 10: 372-387 (Sept.) 1938.

ceptive practice. It has been shown that before admission:

1. There were the expected religious and occupational differences in the extent of contraceptive practice.

2. While contraception was practiced the risk of conception was almost 60 per cent below that incurred without contraception.

3. Withdrawal, douche or condom, used alone or in combination, was relied on in 90 per cent of the contraceptive practice.

4. The risk of conception while the condom was used alone was 80 per cent below the noncontraceptive level, the corresponding figure for the douche being 40 per cent.

After the hospital had given advice to this interested group:

1. The relative dependence on contraception increased from 65 to 95 per cent.

2. The pregnancy rate for contraceptive practice declined about 70 per cent below the preclinic level, all methods contributing to the increase in protection; the contraceptive rate was about 85 per cent lower than the preclinic noncontraceptive rate of this group.

3. Only 65 per cent of those who purchased the supplies ever used them, and of these 25 per cent were continuing their use 20 months later.

4. It seemed that the technic of instruction, in suggesting alternatives, and the relative inaccessibility of supplies for some had combined to discourage the use of the method advised.

Council on Pharmacy and Chemistry

PRELIMINARY REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING PRELIMINARY REPORT.

PAUL NICHOLAS LEECH, Secretary.

THE PRESENT STATUS OF LIPOCAIC

Lipoaic is the name which has been suggested by Dragstedt and his co-workers for a new pancreatic hormone concerned in some way with the normal transport and utilization of fat, evidence for which was reported by these investigators in 1936. The authors presented evidence¹ to show that the fatty degeneration and infiltration of the liver which occur in depancreatized dogs treated with insulin is not due to the absence of pancreatic juice (enzymes) or to the small amounts of choline and lecithin present in raw pancreas. They concluded that the beneficial effect of the latter was probably due to some specific substance. They obtained such a substance in alcoholic extracts of beef pancreas, for which was suggested the name Lipoaic.² The method of preparation of the extract was described in detail in a subsequent report.³ About the same time Dragstedt and his co-workers⁴ reported the development of typical atheromatosis and arteriosclerosis in six depancreatized dogs which were maintained for from six to nine months on insulin but which were repeatedly permitted to develop fatty livers of lipoaic deficiency.

Dragstedt⁵ has reviewed the results of these investigations and indicates that the evidence seems sufficient to warrant the

1. Van Prohaska, John; Dragstedt, L. R., and Harms, H. P.: The Relation of Pancreatic Juice to the Fatty Infiltration and Degeneration of the Liver in the Depancreatized Dog, *Am. J. Physiol.* **117**: 166 (Sept.) 1936.

2. Dragstedt, L. R.; Van Prohaska, John, and Harms, H. P.: Observations on a Substance in Pancreas (a Fat Metabolizing Hormone) Which Permits Survival and Prevents Liver Changes in Depancreatized Dogs, *Am. J. Physiol.* **117**: 175 (Sept.) 1936.

3. Clark, D. E.; Vermeulen, C. W.; Donovan, P. B., and Dragstedt, L. R.: Fractionation Studies on Lipoaic, *Am. J. Physiol.* **126**: 464 (July) 1939.

4. Dragstedt, L. R.; Goodpasture, W. C.; Vermeulen, C. W., and Clark, D. E.: Arteriosclerosis in Depancreatized Dogs, *Am. J. Physiol.* **126**: 479 (July) 1939.

5. Dragstedt, L. R.: The Present Status of Lipoaic, *J. A. M. A.* **114**: 29 (Jan. 6) 1940.

conclusion that the active substance in the pancreas is probably not choline and, since it is not present in the external secretion of the gland, that it represents a specific internal secretion or hormone distinct from insulin. He states that, while the function of the hormone is still but little understood, the known experimental facts indicate that removal of the pancreas in dogs produces in addition to hyperglycemia a lipemia, acidosis and marked accumulation of fat in the liver within two or three days, which can be attributed to a lack of insulin; whereas, with the administration of food, active pancreatic juice (enzymes) and sufficient insulin, early lipemia, acidosis and accumulation of fat in the liver disappear, but later there appears decreased tolerance to insulin and a reduction in the concentration of blood lipids as evidence of the fatty liver of lipoaic deficiency. In 154 depancreatized insulin-maintained dogs examined post mortem the late fatty enlargement of the liver failed to develop in only thirteen animals. If an extract the equivalent of from 60 to 100 mg. of dried pancreas is administered daily either orally or subcutaneously to such an animal when insulin tolerance (dextrose excretion) is minimal, the blood lipids rise to normal and fat disappears from the liver, as demonstrated by biopsy. The author points out that four cases of the latter form of hepatomegaly in human beings with diabetes mellitus well controlled by diet and insulin are reported to have been successfully treated with lipoaic. He suggests that the high incidence of presenile arteriosclerosis as a complication in diabetes, believed by some to be increased with high fat diets, may be related to lipoaic deficiency on the basis of the evidence that arteriosclerosis is produced in depancreatized dogs maintained with such deficiency.

Wolfe⁶ treated 100 cases of diabetic and nondiabetic atherosclerotic gangrene with from 1 to 3 cc. daily or alternate daily injections of a pancreatic tissue extract (Desympatone, Sharp & Dohme, Inc.) in conjunction with other therapy and obtained about 75 per cent healing in all cases. The author attributes the failure of the usual diabetic management in many cases of gangrene to the lack in insulin of some substance present in the pancreatic extract. He concludes that pancreatic extract (enzyme free) in diabetic and arteriosclerotic gangrene seems not only to produce early arrest of pathologic processes but also to stimulate repair more rapidly and completely than any other conservative method. He indicates that the active substance of enzyme-free pancreatic extract exerts beneficial influence on lipid metabolism in general and suggests that the combination of insulin, diet and pancreatic extract may prevent the early appearance of atherosclerosis in diabetes.

Reports of other groups of investigators on the effects of pancreatic extracts have appeared in the foreign as well as the American literature. Neither Wolfe nor Dragstedt has made reference to each other's reports, despite the fact that both investigators published reports concerning pancreatic extracts several years ago. The recent article published by Dragstedt⁵ resulted in an interesting exchange of published correspondence.⁷ The first communication from Barney Lihn, M.D., Vineland, N. J., criticizes the Dragstedt article for failure to refer to the work of the Wolfe group at Temple University. A second communication from Dragstedt suggests that the Wolfe extract is probably not the same as lipoaic. The third and last correspondent, Asher Yaguda, M.D., Newark, N. J., indicates that Wolfe and his colleagues presented an exhibit before the 1937 meeting of the New Jersey State Medical Society at which they are stated to have shown that, in addition to an epinephrine-neutralizing substance, the pancreas also contains a fat-influencing hormone which they called "lipolysin." They are said to have reported a series of cases showing beneficial effects obtained by the use of these two fractions in combination with insulin in patients suffering with diabetes and atheromatosis. Dr. Yaguda states that he asked Wolfe to prepare a summary, which was published in the *Journal of the New Jersey State Medical Society* in March 1938. Reference to this journal reveals a summary report by Wolfe and Digilio⁸ in which no

6. Wolfe, J. B.: Pancreatic Extract (Enzyme Free) in the Treatment of Diabetic and Arteriosclerotic Gangrene, *Am. J. Surg.* **43**: 109 (Jan.) 1939.

7. Lipoaic and Pancreatic Extracts, *J. A. M. A.* **114**: 601 (Feb. 17) 1940.

8. Wolfe, J. B., and Digilio, V. A.: Pancreatic Hormone (Insulin Free) in Cardiovascular Disease, *J. M. Soc. New Jersey* **35**: 170 (March) 1938.

mention of the fat-influencing hormone is noted. It is simply indicated that pancreatic extract is a promising remedy for the relief of angina pectoris, intermittent claudication, obliterative vascular disease of the extremities and associated symptoms in patients suffering from arteriosclerosis. Whatever evidence may have been presented at the exhibit mentioned, it is not included in the published summary. The report did, however, suggest the *modus operandi* of the substance to be that of a parasympathetic stimulant, to influence fat metabolism and to improve muscle metabolism. The term "lipolysin" was not mentioned.

Following the publication of the correspondents' controversial comments concerning pancreatic extracts, the Council office received the following communication from Dr. J. B. Wolfe of Temple University, Feb. 28, 1940:

As a result of work on various fractions obtained from the pancreas we believe that some of our findings may prove of interest to the members of the section of pharmacology. I am particularly referring to Desympatone (epinephrine influencing fraction) and Lipolysin (fat influencing fraction). Dr. Dragstedt of Chicago worked with a preparation which, we believe, is very similar to ours and obtained some very interesting results. We are writing to you at this time because of some comment in the February 17 issue of *THE JOURNAL* under Correspondence, page 601.

In an effort to obtain some understanding of the difference or similarity between lipocaic (Dragstedt) and lipolysin (Wolfe), the Council office replied by asking Dr. Wolfe to supply a definition of the latter term as used by him. Dr. Wolfe replied March 11, 1940, partly as follows:

We use the term *Lipolysin* as one would interpret broadly the combined word of "splitting-fat." A much better term would be one which would suggest influencing fat, rather than splitting; but when we first used the fraction of the pancreas we were impressed with the following two effects and therefore used the term *lipolysin*:

1. Reduction of cholesterol and phospholipins in the blood.
2. The appearance of a choline or choline-like substance in the urine which gave a positive reaction with Kraut's reagent and after isolation has most of the properties of choline with one exception, and that is that it produces heart block in atropinized animals, while all the other choline preparations such as acetylcholine and mecholyl are pharmacologically inactive following atropinization in certain amounts.

It is quite possible that further researches may prove this term unsuitable.

A further communication from Dr. Wolfe points out that the evidence to suggest the existence of a pancreatic fat-influencing hormone, which is not given in the published summary of his work just noted, was presented on charts at the exhibit mentioned, which explains the conclusion presented in the published summary concerning a possible influence on fat metabolism. According to Dr. Wolfe, these charts included the term "lipolysin" and illustrated the lowering effects of pancreatic extract on phospholipins and cholesterol in patients with angina pectoris and obliterative vascular disease of the extremities. In his communication Dr. Wolfe also calls attention to published summaries⁹ of an earlier report made before the fifteenth International Physiological Congress, August 1935, at which time, he states, were shown illustrations indicating the epinephrine-neutralizing and lipid-lowering effects of pancreatic extract. These illustrations accompany his communication, one of which shows the lowering effects of the extract on whole blood lecithin and serum cholesterol in rabbits. The published summaries, however, do not include this evidence or mention the term "lipolysin"; they mention simply that particular attention was called to a "desympatone" epinephrine-neutralizing fraction and that the work suggested the presence of a lecithin-influencing fraction in insulin-free pancreatic extract. Dr. Wolfe further indicates that, while their methods of standardization of the "desympatone" fraction are fairly satisfactory, the "lipolytic" fraction is as yet difficult to standardize and that because of this difficulty they were not only unable to evaluate their own results with this fraction but could not compare results with those reported by Dragstedt and his co-workers.

Reference to the previous reports of Wolfe and his collaborators indicates that their work was primarily concerned with evidence for the vasodilator and epinephrine-neutralizing properties

of a pancreatic tissue extract furnished by Sharp and Dohme, Inc., under the proprietary name "Desymptone" and its use in the treatment of "angiospastic symptoms," particularly angina pectoris and intermittent claudication. These reports cite references to the similar work of earlier investigators and to reports indicating that extracts of several other tissues exhibit similar properties. The firm of Sharp and Dohme, Inc., now markets what is claimed to be a more highly purified pancreatic extract, free of the reaction-producing constituents of other tissue extracts, for the treatment of intermittent claudication and for ureteral relaxation and dilatation, under a new proprietary name, "Depropanex." The promotion of a pancreatic tissue extract under the proprietary name "Depropanex" (Desympatone) by Sharp and Dohme, Inc., for use in the treatment of any condition on the basis of such meager evidence is considered unfortunate and is certainly not in the interest of scientific therapeutics.

Whether or not the extract Dragstedt has prepared also possesses the vasodilator and other properties of Wolfe's pancreatic tissue extract is not indicated in the former's status report.⁵ Goodpasture et al.¹⁰ and Dragstedt et al.¹¹ have reported a method of assay for lipocaic, and Munch¹² a method for bio-assay of Wolfe's pancreatic extract. While the method of extraction is somewhat similar, the methods of assay reported for the two extracts are quite different. Whether or not crude insulin-enzyme-free extract of the pancreas represents more than one hormonal substance or simply one in which impurities possessing vasodilator properties of tissue extracts in general are present is not clear. Wolfe's published reports do not contain evidence to prove that the two fractions or hormones mentioned in his communications have been isolated.

Stewart and others (including Dragstedt¹³) have reported the use of lipocaic in the treatment of psoriasis, which disease has been felt to involve some degree of metabolic disturbance. An abstract of a later report by Clark, Walsh, Julian and Dragstedt¹⁴ on the same subject, at the meeting of the Federated Biological Societies at New Orleans, indicates that, of the total of twelve cases of psoriasis treated daily with orally administered pancreatic extract, 50 per cent showed almost complete disappearance of the lesions with lipocaic alone and 25 per cent improved more rapidly than usual when local treatment was supplemented by lipocaic, while 25 per cent failed to show any improvement. In the series treated only 50 per cent had an initial hyperlipemia, and, whereas lipocaic tended to lower the blood lipids in all the cases, those with the highest blood lipids seemed to be the most resistant to treatment. The authors indicate that lipocaic seems to be a valuable adjunct in the treatment of psoriasis. While pointing to the favorable effect of lipocaic in psoriasis, the report can hardly be considered as conclusive evidence of its value in this disease. It is noted that Dragstedt did not include reference to this study in his status report.⁵

At present no commercial preparation of lipocaic is marketed. Further investigation to establish the exact nature and physiologic significance of so-called lipocaic appears to be necessary before its place in the treatment of disease can be accurately evaluated. Whether or not it may prove to be another important factor in the treatment of diabetes mellitus is at present only speculative. The results of future investigations are awaited with great interest. In the meantime the use of pancreatic extracts containing lipocaic must be considered as entirely in the experimental stage.

In view of the experimental status of Lipocaic, the Council postponed consideration to await development of further critical evidence and expressed the view that the preparation should not be recognized for routine practice.

10. Goodpasture, W. C.; Vermeulen, C. W.; Donovan, P. B., and Dragstedt, L. R.: Bromsulphalein Liver Function Test as Method of Assay of Lipocaic, *Am. J. Physiol.* **124**: 642 (Dec.) 1938.

11. Dragstedt, L. R.; Vermeulen, C.; Goodpasture, W. C.; Donovan, P. B., and Geer, W. A.: Lipocaic and Fatty Infiltration of the Liver in Pancreatic Diabetes, *Arch. Int. Med.* **64**: 1017 (Nov.) 1939.

12. Munch, J. C.: Pharmacology and Bio-Assay of Insulin-Free Extracts, *Rev. Gastroenterol.* **6**: 50 (Jan.-Feb.) 1939.

13. Stewart, C. D.; Clark, D. E.; Dragstedt, L. R., and Becker, S. W.: Experimental Use of Lipocaic in the Treatment of Psoriasis: Preliminary Report, *J. Invest. Dermat.* **2**: 219 (Aug.) 1939.

14. Clark, D. E.; Walsh, Edmund; Julian, O. C., and Dragstedt, L. R.: Experimental Use of Lipocaic in the Treatment of Psoriasis, *Am. J. Physiol.* **129**: P334 (May) 1940.

9. Wolfe, J. B.; Munch, J. C.; Rabinowitz, H. M., and Diglio, V. A.: Desympatone—A Fraction of Insulin-Free Pancreatic Extract, *Summaries of Communications, State Publishing House for Biol. and Med. Lit., Moscow, Leningrad, 1935*, p. 436; also published in *Proc. XVth Internat. Physiol. Congress, August 1935, Sechenov J. Physiol. U. S. S. R.* **21**: 266 (State Biol. and Med. Press) 1938.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, OCTOBER 26, 1940

CASE POSTPONED INDEFINITELY

According to an announcement issued in Washington on October 17 by United States Attorney Edward M. Curran, Justice James W. Morris, who is presiding in Criminal Court No. 2 of the District Court, disqualified himself from sitting on the case because of his former connection with the Justice Department as assistant attorney general. Justice F. Dickinson Letts, now presiding in Court No. 1, is in the middle of a first degree murder case and has a heavy assignment for the next few weeks. "Since no third criminal court is available at the present time," said United States Attorney Edward M. Curran, "I have taken the case off the assignment and it will be set down for trial in the future on a date agreeable to both the government and the defense."

This postponement will release the officials of the Association, therefore, to a continuation of their work in the headquarters office and in other capacities so essential at the present time.

THE PLATFORM OF THE AMERICAN MEDICAL ASSOCIATION

The American Medical Association advocates:

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.
2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.
3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.
4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.
5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.
6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.
7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.
8. Expansion of public health and medical services consistent with the American system of democracy.

BANTI'S DISEASE OR SYNDROME?

In 1883 Banti described a group of cases characterized by primary enlargement of the spleen, a more or less characteristic secondary hypochromic anemia and a chronic course. The disease passed through typical stages characterized in its advanced stage by hemorrhages from the gastrointestinal tract, ascites and terminal liver cirrhosis. The causative factor was an unknown toxin which acted primarily on the spleen and secondarily on the liver. The essential and distinctive pathologic feature of the spleen was "fibro-adénie" in the malpighian bodies, the process having its inception around the penicillate arteries. This concept received its support from Osler, who defined the new disease entity as follows: "An intoxication of unknown nature characterized by great chronicity. There is a preliminary progressive enlargement of the spleen which cannot be correlated with any known cause, anemia of secondary type with leukopenia, a marked tendency to hemorrhage from the lower esophagus, and a terminal state with cirrhosis of the liver."

The idiopathic nature of Banti's disease soon came into question. Numerous observations appeared demonstrating that splenomegaly and secondary anemia were associated with thrombosis of the splenic or the portal vein. Cauchois¹ collected reports of a number of cases, including his own, of splenomegaly and anemia of pylethrombotic origin. He emphatically refuted Banti's concept. Warthin² concluded on the basis of several observations that "every factor of the symptom complex that Osler lays down as the criterion for splenic anemia is also a factor in the complex of portal sclerosis and thrombosis." Eppinger in his classic treatise on hepatolienal diseases devotes a chapter to the relationship between portal congestion and splenomegaly. Klemperer³ reported a case of cavernomatous transformation of the portal vein presenting clinical and pathologic characteristics corresponding in all respects to that of Banti's. Larrabee,⁴ on the basis of a study of forty-seven cases, concluded that in the majority of cases presenting the clinical picture of Banti's disease the condition is dependent on some intra-abdominal lesion obstructing the venous outflow of the spleen. The commonest of these was liver cirrhosis. He states that "we are forced to the conclusion that most if not all of these cases were not only associated with lesions interfering with the outflow of blood from the spleen but were actually the results of such lesions." Larrabee suggested that the syndrome be referred to as chronic congestive splenomegaly. Johnston,⁵ in his

1. Cauchois, H.: Splénomégalie chronique d'origine pylethrombotique. Thèse de Paris, Paris, Steinheil, 1908.

2. Warthin, H. S.: The Relation of Thrombophlebitis of the Portal and Splenic Vein to Splenic Anemia and Banti's Disease, *Internat. Clin.* 4: 189, 1910.

3. Klemperer, Paul: Cavernomatous Transformation of the Portal Vein, *Arch. Path.* 6: 353 (Sept.) 1928.

4. Larrabee, R. C.: Chronic Congestive Splenomegaly and Its Relation to Banti's Disease, *Am. J. M. Sc.* 188: 745 (Dec.) 1934.

5. Johnston, J. M.: The Relation of Changes in the Portal Circulation to Splenomegaly of Banti's type, *Ann. Int. Med.* 4: 772 (Jan.) 1931.

study on the relative size of the hepatic portal radicles in splenic anemia and Banti's disease, concluded "We are dealing here with mechanical alterations of the portal blood flow interfering with the free exit of blood from the spleen."

Interesting contributions have recently come from the Combined Spleen Clinic at the Presbyterian Hospital, New York. Rousselot⁶ calls attention to the fact that the appearance of the portal circulation in the course of a splenectomy for Banti's disease is at once indicative of portal hypertension. This dilated and tortuous collection of veins in the splenic pedicle and the enormously dilated veins of the large collateral circulation in the adhesions surrounding the spleen make the removal of the spleen in these cases a formidable and hazardous procedure. This local vascular condition, Rousselot points out, was present regardless of the nature of the "obstructive factor." Microscopic examination of the removed spleens revealed the essential similarity of the changes in the various cases. Thompson⁷ of the same clinic sums up the experience of the clinic comprising 137 cases observed in the past ten years. Of this group 100 cases had been followed under nearly ideal circumstances for clinical investigation. Splenectomies were done in sixty-eight cases. The cases were those of splenomegaly with anemia, leukopenia and thrombocytopenia, development of increased collateral circulation between the portal and peripheral venous circulation and microscopic changes in the spleen that are characteristic. The result of this study is a refutation of Banti's concept. Thompson states "It is our current concept that Banti's disease or splenic anemia is the result of mechanical obstruction to the flow of blood within the portal system. With high portal pressure and relatively low peripheral pressure a reversal in the direction of normal blood flow can take place. This reversal is aided by the absence of valves in the portal system. A careful study of our clinical material leads to the conclusion that there are no significant differences clinically or hematologically between the congestive splenomegalies resulting from the various obstructive factors."

The histologic characteristics of the removed spleens were the same in all groups. All presented variable degrees of follicular atrophy, of fibrosis of the pulp with dilated venous sinuses, and all had the characteristic perifollicular hemorrhages. The obstructive lesions are either intrahepatic or extrahepatic. The intrahepatic lesion is cirrhosis; indeed, hepatic cirrhosis was the obstructive factor in 68 per cent of the cases. Rousselot and Thompson injected silica particles into the splenic veins of dogs and produced after two years a congestive splenomegaly with extensive collateral circulation. Thompson emphasizes that absence of cirrhosis as the

obstructive agent at the time of splenectomy means that it will not appear subsequently. Thus he says "We have yet to see a patient develop the sequence of events characterized by Banti as the three stages of the syndrome."

Thompson and his associates⁸ have made observations on the splenic vein pressure in fifteen cases in the course of operation by inserting the needle of the venous pressure apparatus into the splenic vein. The relatively great increase in splenic pressure in cases of Banti's syndrome when compared with the venous pressure simultaneously recorded in the arm suggests that portal hypertension is an important factor in the production of the chronic splenomegaly.

The contention of the workers of the Combined Spleen Clinic is that Banti's disease or splenic anemia is a secondary mechanical manifestation of any of a variety of lesions producing chronic splenic vein hypertension. They therefore suggest that the terms Banti's disease and splenic anemia be replaced by congestive splenomegaly, as originally suggested by Larrabee.

The type of liver cirrhosis in prolonged schistosomiasis results in the greatest increase in portal pressure and the largest spleens. The behavior of this parasitic disease is ideal for the production of portal hypertension. Campbell,⁹ on the basis of his extensive experience with schistosomiasis in the Orient, expresses the belief that most of the so-called Banti's disease of the Orient is actually schistosomiasis. He considers it probable that the disease as originally described by Banti might be schistosomiasis because of the proximity of Italy to Egypt, where the "Egyptian splenomegaly" has come to be recognized as schistosomal in origin.

THE CLEVELAND MUSEUM OF HEALTH

Effective presentation of health exhibits has been achieved in only a few places, notably at recent world's fairs. Chicago's Century of Progress, the New York World's Fair and the Golden Gate International Exposition, as well as fairs held at Dallas, San Diego and the Great Lakes Exposition at Cleveland, contained health exhibits of notable attractiveness. At all these fairs, exhibits by the American Medical Association were prominent in the display.

The health museum idea is not an innovation. Quacks have used adaptations of it for centuries. Permanent health exhibits have been established from time to time in connection with several leading general museums. Small exhibits have been held in many localities by numerous health agencies. As long ago as 1920, efforts were made on a small scale to establish a health museum in the Harlem district in New York. The Dresden

6. Rousselot, L. M.: The Role of Congestion (Portal Hypertension) in So-Called Banti's Syndrome, *J. A. M. A.* 107: 1788 (Nov. 28) 1936.

7. Thompson, W. P.: The Pathogenesis of Banti's Disease, *Ann. Int. Med.* 14: 255 (Aug.) 1940.

8. Thompson, W. P.; Caughey, J. L.; Whipple, A. O., and Rousselot, L. M.: Splenic Vein Pressure in Congestive Splenomegaly (Banti's Disease), *J. Clin. Investigation* 16: 571 (July) 1937.

9. Campbell, H. E.: Schistosomiasis and Banti's Disease: An Inquiry into Their Possible Relationship, *Chinese M. J.* 53: 459 (May) 1932.

Museum of Hygiene in Germany and the Wunder des Lebens Exposition in Berlin were extensively developed in the decade between 1925 and 1935. Out of the New York World's Fair will grow a permanent health exhibit known as the American Museum of Health. Out of the Chicago Century of Progress and other sources grew the health exhibits at the Rosenwald Museum of Science and Industry in Chicago.

The principles and purposes of health museums have been endorsed by the American Medical Association through participation in the important world or regional expositions as well as through assistance rendered local exhibitors by the Association's Bureau of Exhibits in state and local fairs and temporary health museums. On June 11 the House of Delegates of the American Medical Association adopted a resolution with reference to the American Museum of Health, which states:

Resolved, That the American Medical Association at its ninety-first annual session, held in New York, approves of this museum, urges its constituent and component societies to support and promote the development of similar museums in other parts of the United States and instructs its Board of Trustees, officers and employees to give all possible support to such museums wherever they may be developed in the United States in conjunction with local medical organizations.

The opening of a Health Museum in Cleveland with support from individuals and from civic bodies, among which the Cleveland Academy of Medicine is a leader, is a development directly in accord with the resolution passed by the House of Delegates. Cleveland has long been known as one of America's progressive cities. The addition of a Museum of Health, the first independent institution of its kind actually to be opened in the United States, to existing educational and cultural facilities in Cleveland is a logical step. In time it may well be emulated by many of the larger cities in the United States. Under medical and civic leadership and the technical direction of a physician experienced in exhibit technic, the institution should be a success and should contribute to the health and welfare of the people of Cleveland.

Physicians from Cleveland, the state of Ohio and elsewhere will participate in the formal opening of the Museum, which is to take place November 11 and 12.

During the past decade permanent health exhibits have been established in several museums over the country, especially the Toledo Museum of Science, the Buffalo Museum of Science and the New York Museum of Science and Industry. The most comprehensive group of health exhibits yet to be shown will be opened to the public this month at the Museum of Science and Industry in Chicago.

That the medical sciences should take their place alongside the other sciences that ease the path of man on this earth is perfectly proper. The visitor, coming as he does with an open and receptive mind, is able to obtain a proper perspective of the place that medicine takes in his life.

Current Comment

GUY'S HOSPITAL REPORTS PRESENTS SIR ARTHUR F. HURST NUMBER

The fourth part of the 1939 volume of *Guy's Hospital Reports* is dedicated to Sir Arthur F. Hurst on the occasion of his retirement from editorship. A steady contributor since 1906, Hurst became editor of the *Reports* in 1921. He had contributed to the *Reports* seventy-eight articles, sixty-four of these during his editorship of the *Reports* from 1921 to 1939. The testimonial number contains a complete list of the articles contributed by him to the *Reports* as well as a list of articles contributed by his associates. Fourteen of the more important papers of Sir Arthur have been selected to be reprinted in this issue. They reflect eloquently the breadth of the clinical and scientific interests of the author. The articles deal with the function and the diseases of the esophagus, stomach and intestine, Addison's anemia, asthma and disorders of the nervous system. The volume is a fitting testimonial to Sir Arthur's wide interests and indefatigable energy.

AUTOMOBILE AND MEDICAL EXPENDITURES IN FAMILY BUDGETS

Recent studies by the United States Bureau of Labor Statistics indicate that the much exploited difficulties in the payment for medical care are due more to the increase of expenditures for other items in the family budget than for medical care itself. The Bureau of Labor Statistics has recently set up a new basis for the index figures on costs and standards of living.¹ This required a detailed analysis of all recent budget studies. This analysis broke down the various items in the budget into such classes as food, clothing, fuel, house furnishings and miscellaneous. In this "miscellaneous" item the greatest change in expenditures was found. The periods compared are 1917-1919 with 1934-1939. Expenditures for food and clothing made up a smaller percentage of the family budget in the later period, while the expenditure under "miscellaneous" increased from 17 per cent of the total budget in 1917-1919 to 26.8 per cent in 1934-1939. The new index will be based on 1935-1939 and, when allowances are made for changes in the value of money and the exclusion of certain items which were previously counted as "savings," the percentage of expenditures for "miscellaneous" in the average budget is raised from 23.7 for 1923-1925 to 26.9 in 1935-1939. When this "miscellaneous" item is analyzed, expenditures for automobiles are found to have been practically negligible from 1917 to 1919, but now "in combination automobile purchases and operation constitute almost one fifth of the new miscellaneous index." At the same time the "weight for medical care is less by one half." During the last twenty years the purchase and care of automobiles seem to have had greater appeal than the desire for additional medical service. No doubt improved health has also lessened somewhat the need for more medical service.

1. The Bureau of Labor Statistics' New Index of Cost of Living, Monthly Labor Review 51: 367 (Aug.) 1940.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

COOPERATION OF HEALTH AGENCIES WITH ARMY AUTHORITIES

In Mobilization of a National Guard Regiment

TRAVIS P. BURROUGHS, M.D.
and

ALFRED L. FRECHETTE, M.D.
Concord, N. H.

At the time of the induction into federal service of one of New Hampshire's National Guard regiments on September 16 the New Hampshire State Board of Health, cooperating with the New Hampshire Tuberculosis Association, the Adjutant General of the state of New Hampshire and the federal military authorities, carried out field laboratory services in the form of chest x-ray examinations, serologic tests of the blood and urinalyses on a total of 1,552 officers and enlisted men. The work had to be completed in nine working days as the regiment was leaving the state on September 26. It was done without delaying or interfering in any way with the army's regular physical examinations, which were done concurrently by the army surgeons.

The facilities provided by the army consisted of a small building formerly used as a cook shack, equipped with electricity, running water and waste drainage. The New Hampshire Tuberculosis Association furnished personnel to take medical histories and technicians for doing the x-ray work. The x-ray unit was under the personal direction of Dr. Robert B. Kerr, executive secretary and clinician of the New Hampshire Tuberculosis Association. The state board of health set up a urinalysis laboratory on the premises and organized a unit for taking specimens of blood for serologic tests and provided a portable x-ray apparatus. The serologic tests were done in the regular laboratory of the state board of health. The workers from the health agencies were assisted by five privates from the medical detachment who were used to direct the flow of men, wash bottles and keep the premises in order.

The personnel of the regiment first underwent their regular army physical examination. Immediately following his physical examination each man proceeded to the laboratory unit. A latrine was built near the shack and as each man reported he was given a urine specimen bottle and asked to void. He entered the laboratory bottle in hand. A card was filled out with his name and short family, medical and occupational history. Army serial numbers not having been assigned, each card had previously been numbered consecutively. Having the cards machine numbered prevented the possibility of duplication or of skipping a number. The number on the card was placed on the urine specimen, the blood tube and the x-ray film. Each man held his own card. The cards were collected as the men went out by another door.

Urine specimens were tested for specific gravity, albumin and sugar. The nitric acid technic was

employed in testing for albumin. A microscopic examination of the centrifuged sediment was done on every specimen showing albumin, followed by examination of a check specimen. Benedict's solution was used for sugar tests. Specimens giving a positive reaction to the qualitative tests were tested quantitatively, followed by examination of a check specimen.

The blood specimens were examined by the Hinton flocculation test. In each instance of a positive reaction a second specimen was taken. This was tested by the Kahn, Kline, Hinton and Eagle technics.

With these facilities and personnel it was found possible to examine 400 men during a nine hour working day. The men could be roentgenographed at the rate of sixty an hour for one or two hours at a time. Rest periods of twenty minutes had to be provided at these intervals, as the personnel could not keep up such a rate for long periods.

To prevent overheating of the x-ray tube, two¹ tube heads were used. After every thirty to forty films the tube heads were changed, so that while one head was in use the other was cooling. It took about three minutes to change heads. The refrigeration room of the cook shack provided an excellent dark room and two workers were kept busy changing cassettes. Six cassettes were used.

The chest x-ray films were taken with a standard² portable unit at a distance of 36 inches at 15 milliamperes and 80 kilovolt peak. Films were unloaded from the cassettes, repacked in the one-half gross cartons in which they came and sent to three local hospitals for developing. If the developed film suggested cardiovascular disease, the individual was taken to the office of a local roentgenologist for fluoroscopic study and 72 inch films.

Blood from nine men was found positive. All were checked. In each case the second blood specimen was also found positive. A trace of albumin was found in the urine in twenty-six cases and a moderate amount in two cases. In one of these the microscopic examination revealed large numbers of hyaline and granular casts. Ninety-two men showed traces of sugar in the urine. On reexamination eleven still had sugar, the largest amount being 0.8 per cent. The question of emotional glycosuria is brought up. Time did not permit continued study to determine whether the glycosuria persisted.

The chest x-ray films revealed seven cases of parenchymal tuberculosis, all minimal. One film revealed a mediastinal tumor, diagnosed as either Hodgkins' disease or lymphosarcoma. Two cases were recommended for further study. In one, a baker, there was a question of yeast infection at the base of one lung, and the other showed a small area of rarefaction in the hilus. In eight cases the 36 inch films were complemented by fluoroscopic study and 72 inch films. One of these was diagnosed as having widening of the arch of the aorta and another as myocardial weakness and dilatation.

1. Second tube head lent by Picker X-Ray Corporation.
2. Waite portable unit.

MEDICAL PREPAREDNESS

Jour. A. M. A.
Oct. 26, 1940

The cost of this project to the state board of health and the New Hampshire Tuberculosis Association for the special supplies and personal services and the small amount of additional equipment required was \$1,870.35. To this may be added the less obvious cost of salaries of regular personnel of the health department and tuberculosis association utilized in the project, amounting to \$724, and depreciation in value of the x-ray unit estimated at \$200. The total of \$2,794.35 thus derived have justified this expenditure. We feel that the results Detroit tuberculosis case finding program, Dr. Henry Vaughan³ has estimated that the finding of a case of tuberculosis in the minimal stage of the disease is a saving to the community of a thousand dollars. On that basis alone this project recommends itself as an economical and efficient case finding procedure.

All results were turned over to the army surgeons for their use. We might note that none of the men were discharged because of positive serologic reactions. Treatment was instituted by the army surgeons after evaluation of each case. The men with tuberculosis were discharged to the care of the New Hampshire Tuberculosis Association. With a tour of active military service facing them it was quite important to these men that their cases of minimal tuberculosis be detected and that they be spared the exertions of the coming year. It was equally important to the army that these men should not remain to serve as foci of infection to the men quartered with them.

The work on the regiment of 1,400 men was completed within five days. The laboratory stayed open the remaining four days of the encampment as recruits were being enlisted and all candidates for enlistment were examined. A total of 1,552 men went through the laboratory.

It is planned to continue with this program and to have the New Hampshire State Board of Health and the New Hampshire Tuberculosis Association perform the same service for New Hampshire's other National Guard regiment when it is called into federal service. In times of national emergency, army authorities should not have to provide facilities duplicating those already present in health organizations. Many health departments and nonofficial health agencies have facilities such as laboratories and x-ray equipment which can render a valuable service to the army at the present time. Their facilities should be offered and utilized.

COMMITTEE TO CONSERVE MANPOWER IN THE DEFENSE INDUSTRIES

A National Committee for the Conservation of Manpower in Defense Industries has been organized to execute a new plan of coordinating accident prevention efforts throughout the country. The membership includes safety experts from private industry, executives from the national and local safety councils, labor representatives and state officials. Appointed as special agents of the U. S. Department of Labor, the twenty-four members of the committee are serving entirely on a voluntary basis. The new plan to safeguard the defense manpower of the nation in the emergency of Labor following a recent meeting of various interested groups. It aims to bring to industries operating on government contracts, particularly the smaller indus-

trial units, the experience of the country's largest and best managed industries in accident control. According to *National Safety News*, the plan recognizes the basic necessity of state and local health regulations but emphasizes the need for safety education, training and stimulation extending beyond the scope of laws, rules and codes. The program will be carried out with the assistance of regional representatives and district and local contact men. The contact man assigned will volunteer to assist the management of the industrial plant in organizing a safety program and to make an appraisal of physical hazards and submit information on their management for the duration of the contract and beyond, if desired by the management.

The division of labor standards, U. S. Department of Labor, is acting as the clearing house for all activities in connection with the plan. The technical staff of the division's safety and health section is responsible for the preparation, under the direction of the national committee, of procedures, forms, and promotional, educational and technical material. The safety and health section will keep records of accident experience in the defense industries and report its conclusions to the national committee.

RECOMMENDATIONS OF PHILADELPHIA COUNTY SOCIETY

The board of directors of the Philadelphia County Medical Society, September 18, approved two sets of recommendations dealing with the military establishment in its relation to medical practice. The board suggested that every hospital classify its staff under three categories: (a) those who can be most easily spared for military service, (b) those who can be spared in the event of a military emergency and (c) those who cannot be spared under any circumstances. It was suggested that a committee be appointed by the president of the society, including representatives of the Philadelphia Health Council, the board of health and the council of social agencies, to see that medical needs in each section of the city are fulfilled. It was recommended that fees for medical service be adjusted for families whose income has been reduced by conscription or enlistment of the major wage earner.

To protect physicians who serve in the armed forces, the board presented a plan for arrangements with physicians who take over the practice of those in service. First, it was recommended that the physician leaving his practice send cards to his patients stating who is to be in charge of his practice and register the arrangement with the county medical society. The locum tenens should agree to place all funds collected from patients thus turned over to him in a separate fund, to deduct the amount necessary to cover overhead and divide the remaining funds 50-50, and when the practitioner returns from military service to refer all his patients back to him.

The board urged that all institutional, teaching and industrial appointments held by the practitioner be made available to him without loss of rights, seniority or privileges when he returns from service. Those serving in such positions during the emergency should feel that acceptance of them is purely on a temporary basis, the board pointed out.

The board recommended that, during the period of military service of any member of the society, the portion of the annual dues now retained by the society be remitted.

3. Statement made by Dr. Henry Vaughan in a lecture given at the Harvard School of Public Health, Nov. 25, 1938.

ORGANIZATION SECTION

HOSPITALIZATION OF NEGRO PATIENTS

A REPORT FROM THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS

During hearings on the Wagner-George hospital construction bill the problems of the hospitalization of Negroes were discussed by a group of persons experienced in hospital administration, which met at the invitation of the Surgeon General of the United States Public Health Service.

It was generally agreed that added and better hospital facilities were needed by the Negroes of the South. It was further agreed that the interests of the colored race would be best served by making provision for them in institutions designed to serve the entire population rather than by the establishment of separate hospitals caring for Negroes only.

Summary of Reports from 111 Negro Hospitals for the Year 1939

	Number	Beds	Admissions	Average Daily Census
General	88	6,413	105,047	3,990
Nervous and mental....	6	9,884	2,783	9,764
Tuberculosis	13	1,317	1,365	1,005
Maternity	1	50	80	33
Hospital departments of institutions	3	85	881	24
Total	111	17,749	110,156	14,816

In most sections of the country existing hospitals of all types and under all auspices admit patients without regard to race or color. Many of them make no separate record of Negro patients, so that a complete census of those patients has been impossible.

However, in the Annual Census of Hospitals for 1932, in response to a question as to whether the hospital admits Negroes, 3,010 other than Negro hospitals and not including any mental hospitals reported in the affirmative. These included 2,442 general hospitals and 568 special hospitals. No census of Negro patients in these hospitals was possible.

From 111 Negro hospitals—those which are limited to Negroes or have separate buildings for that race—

returns showed a total of 17,749 beds, admitting 110,156 patients. Further figures on the occupancy of Negro hospitals are given in the accompanying table. The Negro general hospitals, numbering eighty-eight, with 6,413 beds, had an average occupancy of 3,990 patients; in other words, the Negro general hospitals had an occupancy rate of 62.2 per cent. In all other general hospitals the average occupancy rate was 69.3 per cent. In the Negro general hospitals there were 16.4 admissions per bed—that is, each bed served 16.4 persons during the year on an average. In all other general hospitals the number of patients admitted was 20.3 per bed. This substantiates, in a general way, what has often been observed in particular instances—that Negroes do not utilize existing Negro hospitals to the same extent that the general population utilizes existing hospitals. Contrast is more striking yet on observation that the rate of occupancy for Negro patients in large Negro hospitals provided by municipalities and non-profit organizations on a charity basis runs as follows:

Homer G. Phillips Hospital, St. Louis, 78.0 per cent occupancy.

Kansas City General Hospital No. 2, 70.8 per cent occupancy.
Freedmens' Hospital, Washington, D. C., 79.5 per cent occupancy.

Negro Hospital, Galveston, Texas, 89.7 per cent occupancy.
Grady Hospital, Atlanta, Ga., 77.7 per cent occupancy.

These hospitals were, of course, included in the eighty-eight Negro general hospitals referred to.

In 1938 a special survey of hospital facilities in the state of Mississippi was reported in *THE JOURNAL* June 3, 1939, page 2317.

Each locality has its own peculiar conditions which are to be understood and met in providing hospital facilities for its population. Careful study and consideration in the interests of the whole population in each community should be the basis of action. Due account should be taken of existing facilities.

WESTERN NEW YORK MEDICAL PLAN, INC.

GEORGE R. CRITCHLOW, M.D.

Medical Director
BUFFALO

The Western New York Medical Plan, Inc., was organized late in 1939 after a two year study of the subject of medical expense indemnity by a committee representing the eight counties of western New York: Alleghany, Cattaraugus, Chautauqua, Erie, Genesee, Niagara, Orleans and Wyoming. On enactment of the Piper-Hampton bill into law, providing for the incorporation of nonprofit voluntary medical expense indemnity plans, the committee applied for and received the first certificate of incorporation under the new law. License to operate was issued in February 1940, the plan was offered to the public March 1, and the first contracts became effective March 15. The plan operates under the supervision of the New York State

Department of Insurance after having received the endorsement of the State Department of Social Welfare.

ORGANIZATION

It is a nonprofit corporation. The board of trustees, elected by the participating physician members, consists of twenty-five members—sixteen physicians and nine laymen—made up as follows:

Six physicians engaged in active private practice in Erie County.

One physician from each of the other seven counties included in the plan.

Three physicians nominated by the Eighth District Branch of the Medical Society of the State of New York.

Four persons, not physicians, residents of Erie County.

Four persons, not physicians, from the other counties in the area.

One person, not a physician, a resident of the area, nominated by the Eighth District Branch of the Medical Society of the State of New York.

There are five standing committees for administration:

1. Executive: Seven members, five of whom must be physicians. This committee manages the corporation under the general control of the board of trustees.

2. Financial: Five members of the board of trustees.

3. Medical Advisory: Eleven members, all physicians, who consider matters referred to them relating to inclusion or exclusion of specific medical and surgical services.

4. Reference and Appeals: Twenty members, all physicians, representing all participating counties, to whom may be referred disputed questions of claims for services.

5. Coding: Five physicians from Erie County, one from each other county, whose duty it is to determine professional qualifications of participating physicians based on statements made in their application for membership. Arbitration boards are provided for, one to be set up in each individual controversy, the conclusions of which are binding on the members involved according to an agreement in their contract.

SUBSCRIBERS' ELIGIBILITY

Any person under 65 years of age who has not had cancer, diabetes, osteomyelitis, chronic nephritis, tuberculosis or coronary thrombosis is eligible for membership. Subscribers reaching the age of 65 may continue membership at the discretion of the corporation. Married women must include their husbands in the contract.

Two types of contract are provided:

1. Medical and Surgical Contract: This provides service for all kinds of medical and surgical conditions, but obstetrics and elective operations are not covered in the first year of the contract.

2. Surgical Contract: The benefits of this contract are limited to surgical cases only plus obstetrics (after first year) and an annual physical examination at the request of the subscriber. There is no limit to total benefits.

There are two classes of members:

1. Those whose annual income is less than a specified amount, as follows: (a) Individuals with \$1,800 or less; (b) man and wife with combined income of \$2,500 or less; (c) subscriber and family, including all unmarried children under 18 years of age, with combined income of \$3,000 or less.

Subscribers in this class receive service without further expense (except for co-insurance provision noted later) up to the limit of benefits under the contract, which are as follows: (a) individual, \$200 of service a year; (b) man and wife, \$300 of service a year; (c) family, \$400 of service a year.

2. Those whose annual income exceeds the amounts that have been noted. For this class of subscribers the contract becomes one of pure indemnity according to a definite schedule of indemnities attached to and made a part of the contract. This class of subscribers is subject to the same limitation of total benefits as is the lower income class, but only on the type 1 contract (medical and surgical). Neither class of subscriber is limited as to total benefits under type 2 contract (surgical).

The subscriber may choose his physician from the list of participating physician members. About 75 per cent of the eligible doctors in the area are members.

Emergency treatment by other than member physicians is paid for, but only one half of the amount that would be paid a participating physician.

Obstetric service is furnished only after the first year of the contract.

The general medical and surgical contract includes house and office calls, hospital calls, consultations, spe-

cialists' fees, operations, anesthesia, x-rays, physical therapy, immunization, and laboratory and pathologic examinations (when not furnished subscriber under a separate hospital service contract).

An individual subscriber must pay the physician one half of the first \$10 for service in any contract year (total \$5) on house and office calls for medical (non-surgical) service. Man and wife and family subscribers must pay half of the first \$20 for service in any contract year (total of \$10). This provision is designed to discourage consulting the doctor for trifling and unnecessary reasons.

MEDICAL SERVICES NOT INCLUDED IN THE PLAN

The medical services not included in the plan are:

1. Cases covered by workmen's compensation insurance.

2. Elective operations during the first year of the contract. These are defined as operations which are not imperative but may be desirable.

3. Services rendered in the treatment of venereal diseases acquired as venereal infections, in the first eleven months of the contract.

4. Any ailment or condition arising from the use of drugs or alcohol.

5. All functional nervous or mental diseases in excess of \$50 expense.

6. Injuries or diseases contracted to which a contributing cause was the subscriber's commission of or attempt to commit a felony, or which occurs while the subscriber in engaged in an illegal occupation.

7. Intentional self-inflicted injuries.

8. Services rendered for a condition known to the subscriber to exist at the time the contract became effective.

9. Congenital defects, except in the newborn on a family contract.

SUBSCRIBERS' DUES

The amounts of subscribers' dues are given in the accompanying table.

Subscribers' Dues

	Monthly	Quarterly	Semiannual	Annual
Medical and Surgical Contract				
Subscriber only, no obstetrics..	\$1.50	\$4.50	\$ 9.00	\$18.00
Man and wife, no obstetrics...	2.25	6.75	13.50	27.00
Family group, with obstetrics..	3.00	9.00	18.00	36.00
Surgical Contract				
Subscriber only, no obstetrics..	0.40	1.20	2.40	4.80
Man and wife, no obstetrics...	1.10	3.30	6.60	13.20
Family group, with obstetrics..	1.70	5.10	10.20	20.40

MEDICAL PARTICIPATION

All duly licensed physicians in the district may become members on written application, by payment of the registration fee and signing a contract. Physicians must give written notice of intention to cancel their membership contract, but such termination of membership will not become effective until thirteen months after date of notification.

Physicians who enrolled before April 1, 1940, paid \$10 as a registration fee, which is returnable as corporation funds are available. All membership fees paid after this date are not to be refunded.

Participating physicians render service regardless of the corporation's ability to pay. All remuneration for their services is on a unit basis. Seventy per cent of the premium income the first year and 75 per cent each year thereafter is set aside for the payment of doctors' bills. Payments are made quarterly, and when the value of the unit is below par for the quarter the balance becomes a contingent liability to be paid as earnings accumulate.

Service is evaluated on the basis of an established fee schedule, most of the items of which are below the pre-

vailing schedule for private patients. Where services are rendered subscribers in the higher income group (class 2) the doctor is paid the amount stated in the contract as indemnity and may charge the subscriber an additional fee by private arrangement. The amount of indemnity due the subscriber under his contract is paid direct to the doctor, and the subscriber agrees in his contract to accept the doctor's receipted bill as satisfaction of the corporation's obligation under his contract.

When a subscriber is treated for emergency illness by a nonparticipating physician, whether within or without the area, the corporation indemnifies the subscriber to the extent of one half the amount it would have paid a participating physician for the same service. The subscriber is obligated to the nonparticipating physician for his entire bill.

EXPERIENCE FOR FIRST SIX MONTHS

The first contracts became effective March 15, 1940, and all were of the complete medical and surgical type. The surgical contract (type 2) is being offered the public on Oct. 1, 1940.

The public's reaction to the plan in this first six months may be termed twofold: First, some prospects complained that the rates were too high. Second, employers objected to the discrimination against men with incomes over the limits set by the plan. They felt that it was bad for industrial relations. The field force found that enrolment was slowed up because in many instances executives and foremen lost interest and failed

to push enrolment when they found that they themselves were excluded because of the income ceiling.

The corporation is trying to meet the first reaction, namely the high cost, by offering another type of contract, the surgical, at considerably lower cost. To meet the second objection, the income limit, the plan will henceforth include those above the income limits set in the original plan. However, for this class of subscriber the contract will be one of straight indemnity rather than service, and a fixed amount of indemnity according to an attached schedule will be paid. When subscribers in this class apply for service under their contract the physician has the privilege of fixing his own fee for the service and may collect from the subscriber that agreed fee less the amount of indemnity payable to the subscriber under the schedule of his contract.

Of claims approved during the first quarter of operation the unit value of remuneration was par. The second quarter ended Oct. 1, 1940, at which time doctor bills will be paid on a unit value of better than 90 per cent. The corporation fully expects greatly increased premium income under the modified plan about to be inaugurated. About 750 doctors are members and something less than 1,000 members are enrolled. About 140 claims have been authorized, over half of which have been medical. Rejections have been few, mostly for preexistent conditions and for elective operations.

The State Insurance Department has recently made its first official examination of the corporation's condition and has reported satisfaction in its observations, considering the unexplored field in which the corporation is operating.

MEDICAL ECONOMIC ABSTRACTS

MICHIGAN MEDICAL SERVICE

After ten years of study and an expenditure of \$30,000 in surveys, the Michigan State Medical Society at a special meeting in January 1939 sponsored the formation and operation of a medical service plan.

On the basis of an enabling act (Michigan Public Act 108 of 1939) the Council of the Michigan State Medical Society proceeded to develop the nonprofit corporate structure of the Michigan Medical Service. This involved the advancement of \$7,800 in organizational expenses plus \$10,000 working capital.

Some of the more important phases of the plan are as follows:

First, membership consists of the members of the house of delegates of the Michigan State Medical Society, which elects a board of directors of thirty-five members, two thirds of whom must be doctors of medicine and the remainder representing various lay groups. No member of the board of directors receives compensation for his services as a director.

Second, district medical advisory boards have been established in each of the councilor districts of the Michigan State Medical Society. Members are selected by the county medical societies on the basis of one board member for each hundred doctors of medicine or major fraction thereof in the county medical society. To these boards are referred all problems involving the rendering of medical services and the approval of payment for services.

Third, the Michigan Medical Service was organized on a statewide basis on the recommendation of the Insurance Department of Michigan. Such statewide administration would result in lower administration costs, uniform subscription rates, and greater financial stability through centralization of reserves.

TWO PLANS OFFERED

Both a Medical Service Plan and a Surgical Benefit Plan are offered. The Medical Service Plan provides the services of physicians in the home, office and hospital. The first \$5 incurred for medical services in any one subscription year must

be paid by the subscriber, and total benefits in one year are limited to \$325 for an individual, \$550 for a husband and wife, and \$875 for a family. This service costs \$2 a month for the individual, \$3.50 for a husband and wife and \$4.50 for the entire family including all children under 19 years of age.

The Surgical Benefit Plan provides the following benefits only while the subscriber is a bed patient in a hospital: surgical, diagnostic x-ray and maternity services after twelve consecutive months in the plan. The monthly rate for these services is 40 cents for an individual, \$1.20 for a husband and wife and \$2 for a family including all children under 19 years of age. These rates are increased somewhat if the proportion of female subscribers in any group exceeds 5 per cent. At least 50 per cent of a group of eligible employees must become subscribers, with a minimum of twenty-five. The Surgical Benefit Plan has no age limit, but an age limit of 65 is fixed for the Medical Service Plan.

ENROLMENT

Since the first subscribers were enrolled in March 1940, membership in Michigan Medical Service has increased to 67,449 participants, as of August 29. The total number of subscribers and the enrolment in each plan is shown in table 1.

A steady increase in enrolment of an average of 1,200 new subscribers each month has been obtained during the summer months. The increasing recognition being given to Michigan Medical Service and the presentation during the fall months, when employees are back from vacations, should make possible a greater monthly enrolment.

Of the forty-six groups of subscribers, including employees of organizations such as the Ford Motor Company, the Michigan State Highway Department, People's Outfitting Company, the Booth Newspapers, the Michigan State Unemployment Compensation Commission, the United Detroit Theaters and the Cavin Lumber Yards, six groups elected the Medical Service Plan and forty the Surgical Benefit Plan.

In several of the groups the subscribers are fairly well distributed throughout the state and doctors in practically every county may have patients who are subscribers.

About one fourth of the subscribers are enrolled under individual certificates, one fourth under husband and wife certificates and one half under family certificates (not including the large enrolment of individual subscribers in the Ford Motor Company group).

SERVICES TO PATIENTS

During the first six months, services were provided for more than 3,000 subscribers, and payments to doctors for these services will be in excess of \$125,000.

A sample study of 1,301 patients who received services under the Surgical Benefit Certificate indicates that 23.8 per cent received services for abdominal surgical procedures (6 per cent for hernias, 15.3 per cent for appendectomies, 1.2 per cent for cholecystectomies, 1.3 per cent for all other abdominal procedures); 25.1 per cent for nose and throat surgical procedures (18.3 per cent for tonsillectomies, 4.7 per cent for submucous resections, 2.1 per cent for all other nose and throat surgical procedures); 29.2 per cent for radiology services (10 per cent for chest x-ray films, 5.5 per cent for gastrointestinal series x-ray films, 13.7 per cent for all other radiology services), and 21.9 per cent for all other surgical procedures.

The foregoing study is for the primary surgical services rendered. Frequently the patient required two or more operations at the same time.

A sample study of 357 patients under the Medical Service Certificate indicates that 70.5 per cent required office or home visits of general examinations (48.7 per cent office visits, 10 per cent home visits, 9.5 per cent general physical examinations and 2.3 per cent all other visits and examinations); 9.5 per cent required eye, ear, nose and throat services (5.04 per cent tonsillectomies, 3.36 per cent refractions, 1.12 per cent all other

TABLE 1.—Enrolment

Month	Medical Plan	Surgical Plan	Total
March.....	1,360	56,758	60,118
April.....	1,341	60,368	61,709
May.....	1,352	61,763	63,135
June.....	1,416	63,646	65,062
July.....	1,594	65,388	66,982
August.....	1,700	65,749	67,449

eye, ear, nose and throat procedures); 8 per cent required radiologic services, and 12 per cent required gynecologic, urologic, pathologic and other services.

PAYMENTS TO DOCTORS

For services during the first six months, a total of 826 doctors have been paid \$92,609.45, or an average payment of \$112.12. In addition, payments estimated to be \$33,000 will be made for services rendered during this six month period as soon as incomplete and late monthly service reports can be approved by the medical advisory board.

At least one out of every eight doctors of medicine in Michigan has been paid, through Michigan Medical Service, for services to subscribers.

The average payment for a patient under the Surgical Benefit Plan has been \$46.18; for a patient under the Medical Service Plan, \$15.15, or an average of \$40.44 per patient. The monthly payment to individual doctors has ranged from a low of \$2 for an office visit to a high of \$762.

TABLE 2.—Statement of Experience from March 1 to July 31, 1940

Earned income	\$150,650.55	100.0%
Medical services:		
Paid	\$87,611.45	
Reserve for pending and unreported services	15,434.44	103,045.89
		68.4%
		\$ 47,604.66
Operating expenses		34,691.55*
		23.0%
Income from operation.....		\$ 12,913.03
Other income		1,396.72†
		8.6%
Net income		\$ 14,309.80

* Includes expenses for the month of February.
† "Other income" was derived from the initial \$5 charges under the Medical Service Plan, from registration fees for nonmember doctors and from interest.

Doctors who have received payments for services are located in sixty-one of the eighty-three counties in Michigan.

In each month, the full schedule of benefits, equivalent to prevailing charges now made by doctors in Michigan for patients in the income group enrolled in Michigan Medical Service, has been paid for all services.

STATEMENT OF FINANCIAL EXPERIENCE

Conclusions relative to the financial experience under Michigan Medical Service must be tentative, as the exact status cannot be given until proper accounting can be made for unreported services. The reserve for pending and unreported services includes an allowance of the average cost for all incompletely reported services not yet paid and for an estimated number of unreported services. The latter estimate is based on a short period of operation and will be subject to correction until it can be computed on a longer period of experience.

As of July 31, 1940, the financial status for the first five months is shown in table 2.

An examination of the experiences under Michigan Medical Service to date indicates that the people in Michigan desire to participate in a nonprofit, nonpolitical, prepayment medical service plan. The inauguration of such a program by the medical profession can further the ideals of a great profession as well as arrange for the payment of medical services on a democratic basis. It appears increasingly evident that the success of the medical service plan will depend on the degree of cooperation it receives from doctors of medicine.

WOMAN'S AUXILIARY

Mississippi

The woman's auxiliary to the Northeast Mississippi Thirteen Counties Medical Society held its second quarterly meeting, June 11, at Macon with the president, Mrs. Bernard Patrick, presiding. The state president, Mrs. E. C. Parker of Gulfport, was guest of honor and presented her plan for the work of the auxiliaries, stressing June as Hygieia month, July as accident prevention month and August as doctors' check-up month. Dr. J. P. Wall, of Jackson, past president of the Mississippi State Medical Association, addressed the auxiliary on "The Menace of Socialized Medicine to the Present High Quality of Medical Service in the United States." Entertainment included tours of Macon's gardens and a barbecue.

Nebraska

The board of directors of the auxiliary to the Nebraska State Medical Association met September 17, Mrs. A. D. Brown, Central City, state president, presiding. At a luncheon given by

Mrs. Brown, the guest of honor was Mrs. V. E. Holcombe of Charleston, W. Va., President of the Auxiliary to the American Medical Association. The members then attended a tea at the home of Mrs. J. Dewey Bisgard, given by the Omaha-Douglas Counties auxiliary.

South Dakota

Mrs. V. Eugene Holcombe of Charleston, W. Va., national president of the Medical Auxiliary, was in Huron, S. D., September 21, to attend a board meeting of the South Dakota State Medical Auxiliary. Those present were Mrs. R. A. Buchanan, Huron, state president; Mrs. F. C. Nilsson, Sioux Falls, president-elect; Mrs. G. H. Gulbrandson, Brookings, first vice president; Mrs. B. M. Hart, Onida, second vice president; Mrs. J. C. Hagin, Miller, recording secretary, and Mrs. J. C. Shirley, Huron, corresponding secretary and treasurer. Also present were committee chairman and district chairmen Mrs. Odah D. Stout, Pierre; Mrs. G. E. Burman, Carthage; Mrs. B. A. Bobb, Mitchell; Mrs. N. K. Hopkins, Arlington; Mrs. M. W. Pangborn, Miller, and Mrs. A. D. Hyden, Sioux Falls.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ADDITIONAL MEDICAL COLLEGE NEWS AND ARTICLES APPEAR IN THE STUDENT SECTION, PAGE 1495.

ARIZONA

State Health Officer in Military Service.—Dr. Frederick P. Perkins, Phoenix, recently appointed secretary and state superintendent of public health, left with the 158th Infantry of the Arizona National Guard for training camp at Fort Sill, Okla., September 23, according to *Public Health News*.

ARKANSAS

Changes in Health Officers.—Dr. Gardner H. Landers, Texarkana, has been appointed health director for Independence County. —Dr. Ewing M. Nixon, Little Rock, has been appointed director of the Mississippi County health unit with headquarters at Blytheville. He succeeds Dr. Roy E. Schirmer. —Dr. Ralph E. Weddington, formerly of Fort Smith, has been named medical director of district number seventeen with headquarters at Melbourne.

Society News.—The Sebastian County Medical Society was addressed, September 10, by Drs. Everett C. Moulton on "Hypertensive Retinitis" and Charles H. Finney, Fort Smith, "Hypertensive Cardiovascular Renal Disease." —Dr. Thomas D. Moore discussed "Use and Abuse of Urinary Antiseptics" before the Mississippi County Medical Society in Blytheville, September 3, and Dr. Conley H. Sanford, "Management of the Aged Patient." Both are of Memphis. —Among others, Drs. Joseph F. Shuffield and Paul L. Mahoney, both of Little Rock, addressed the Sevier County Medical Society in DeQueen, September 10, on "Fractures of the Wrist and Ankle" and "Chronic Cough Hemoptysis," respectively. —The Pulaski County Medical Society was addressed, September 16, by Dr. Silas C. Fulmer, Little Rock, on nephritis.

CALIFORNIA

Southern California Meeting.—The Southern California Medical Association will hold its one hundred and third semi-annual meeting at the California Hotel, San Bernardino, November 15-16. The program will consist of two symposiums, one on the present status of hypertension and the other on nonmalignant diseases of the colon, and the following papers:

- Dr. Milo K. Tedstrom, Santa Ana, Postural Hypotension; Report of Two Cases.
- Dr. Thomas Addis, San Francisco, Treatment of Nephritis.
- Dr. Frederick L. Reichert, San Francisco, Circulatory Disturbance in the Upper and Lower Extremities.
- Dr. Louis C. Bennett, Los Angeles, Intubation Management of Distention in Intestinal Obstruction.
- Dr. James Vernon Luck, Los Angeles, Differential Diagnosis in Low Back Pain.
- Dr. Charles Hunter Shelden, San Marino, Surgical Treatment of Spinal Cord Tumors.
- Dr. Norman H. Williams, Beverly Hills, The Puerperal Cervix.

ILLINOIS

Personal.—Dr. Cornelius E. Kline, formerly of Vienna, has been appointed in charge of the Moline district health unit, succeeding Dr. Carl A. Peterson, who resigned on account of ill health.

Changes in State Personnel.—Dr. Roland R. Cross, Dahlgren, assistant director, state department of health, has been named acting health director and Dr. George W. Morrow, managing director of the Kankakee State Hospital, has been named acting director of public welfare, newspapers reported, October 19. The new appointees succeed Dr. Albert C. Baxter and A. L. Bowen, respectively. Dr. Cross graduated at the American Medical College, St. Louis, in 1910 and Dr. Morrow at the College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1908.

Society News.—Dr. Charles M. Wilhelmj, Omaha, discussed "Physiologic Aspects of Shock" before the St. Clair County Medical Society, September 5, in East St. Louis. —The Coles-Cumberland County Medical Society will be addressed, November 20, by Dr. Earl O. Latimer, Chicago, on "Anatomic Considerations in Repair of Inguinal and Femoral Herniae." —Dr. Leo K. Campbell, Chicago, will discuss

"Benefits and Dangers of Reducing" before the Stephenson County Medical Society in Freeport, November 21. Dr. Nathaniel G. Alcock, Iowa City, will address the society, December 19, on "The Value of Urological Findings in the Diagnosis of Abdominal Tumors." —Dr. Horton R. Casparis, Nashville, Tenn., discussed "Importance of Cooperation in Mental Health" before the Peoria City Medical Society, October 8.

CHICAGO

Personal.—Dr. Robert S. Berghoff, clinical professor of medicine, Loyola University School of Medicine, was recently awarded honorary membership in Alpha Omega Alpha at his alma mater, St. Louis University School of Medicine, St. Louis.

New Hematologic Service.—A new hematologic service at the Michael Reese Hospital has been opened under the direction of Dr. Raphael Isaacs. In addition to the treatment of patients and the study of blood, it is planned to carry on research work in diseases of the blood and blood-forming organs.

Dr. Carlson Presents Library to University.—Dr. Anton J. Carlson, professor and chairman of the department of physiology, Division of Biological Sciences, University of Chicago, has presented his scientific library to the university. His collection includes about 16,000 classified reprints of scientific articles, 1,200 books and research monographs, and complete files of fifteen journals. Dr. Carlson, who completed thirty-six years of active service on the university's faculty when he retired October 1, intends to remain active in research work. He will be professor emeritus.

Anniversary of Birth of Christian Fenger.—Northwestern University Medical School will observe the one hundredth anniversary of the birth of Dr. Christian Fenger with a special convocation in the Archibald Church Library, November 4. The centennial address will be delivered by J. Christian Bay, LL.D., librarian of the John Crerar Library of Chicago. There will be a display of numerous publications of Dr. Fenger's, including his thesis on "Carcinoma of the Stomach," which was submitted to the faculty of the University of Copenhagen for the degree of doctor of medicine. A death mask of Dr. Fenger will also be shown. In 1882 Dr. Fenger was appointed professor of pathology at Northwestern and in 1893 he became professor of surgery and chief of the surgical service of Passavant Hospital.

Society News.—The Polish Medical Society of Chicago was addressed, September 26, by Dr. Francis E. Sencar on "Office Dermatology." —Among others, Drs. Abraham A. Low and Elizabeth P. MacDougall addressed the Illinois Psychiatric Society, October 3, on "Combined Picrotoxin and Metrazol Treatment of Mental Patients." —The Chicago Roentgen Society was addressed, October 10, among others, by Drs. Jerry J. Kearns and Harold C. Voris on "The Early Management of Acute Head Injuries." —The Chicago Pediatric Society was addressed, October 15, by Drs. Katsuji Kato and Pei-kuang Li on "Determination of Blood Pyruvic Acid in Infants and Children: An Attempt to Diagnose Subclinical Deficiency of Vitamin B₁." —Bernard Gumbiner, "Spontaneous Pneumomediastinum in the Newborn Infant," and Stanley Gibson, "Auricular Fibrillation in Childhood." —Dr. Cornelius P. Rhoads, New York, will address a joint meeting of the Institute of Medicine of Chicago and the Chicago Society of Internal Medicine, October 28, on "Physiological Aspects of Vitamin Deficiency." —The Society of Medical History of Chicago will be addressed, November 4, by Drs. Abraham Levinson on "Medical Medallions"; James E. Lebensohn, "Wollaston and Hemianopsia," and Jerome R. Head, "Bretonneau, Trousseau and Velpeau."

INDIANA

University News.—Dr. Alexander T. Ross, former research neurologist of the Michigan Farm Colony for Epileptics, now known as the Caro State Hospital for Epileptics, Wahjamega, Mich., has been appointed assistant professor of neurology at Indiana University School of Medicine, Indianapolis. Dr. Joseph E. Tether Jr. has been named as assistant to Dr. John D. Van Nuys, director of admissions of the university hospitals.

Dr. Harvey Resigns.—Dr. Verne K. Harvey has resigned as director of the Indiana State Board of Health, Indianapolis, to become chief medical officer of the U. S. Civil Service Commission at Washington, D. C., newspapers reported, October 1. Dr. Harvey graduated at the Indiana University School of Medicine in 1929. He received a certificate in public health at Johns Hopkins University in 1933, in which year he was named director of health of Indiana. He has been associate in pathology and bacteriology at his alma mater.

KANSAS

Society News.—Dr. Raynar T. Westman discussed "Undulant Fever" before the Wyandotte County Medical Society, Kansas City, September 24, and Dr. Lewis W. Angle, "Treatment of Postoperative Abdominal Wall Ulcers." Both are of Kansas City.—The Golden Belt Medical Society was addressed in Minneapolis, October 3, by Drs. Clyde B. Trees, Topeka, on "Hip Nailing"; George F. Gsell, Wichita, "Evaluation of Ocular Discomfort"; Abraham E. Hiebert, Wichita, "Treatment of Burns," and Morris Polsky, Kansas City, Mo.; dermatology.—A symposium on diabetes mellitus was presented before the Shawnee County Medical Society, Topeka, October 7, by Drs. Don C. Wakeman, Archibald J. Brier, Paul E. Belknap, John L. Lattimore and James D. Bowen, all of Topeka.

LOUISIANA

Personal.—Dr. James Welch, Long Leaf, has been made medical director of the Central Louisiana Hospital for Insane in Pineville. Dr. Arthur L. Seale, who has been in charge of the hospital since Dr. Stonewall J. Phillips resigned as superintendent several months ago, was made assistant medical director.

MAINE

Fall Clinical Session.—The Maine Medical Association held its annual fall clinical session in Bangor, October 17, at the Bangor House and the Eastern Maine General Hospital. The first evening was devoted to a discussion of obstetrics by Dr. Abraham N. Creadick, associate clinical professor of obstetrics and gynecology, Yale University School of Medicine, New Haven, Conn. The second day was devoted to case presentations, clinical observations and symposiums. A lecture by Dr. George C. Wilkins, Manchester, N. H., on "The New Hampshire Plan for Cancer Control" concluded the program.

MARYLAND

Society News.—A dinner meeting of the Maryland Psychiatric Society and the neuropsychiatric section of the Baltimore City Medical Society, October 10, was addressed by Wade H. Marshall, Ph.D., and Philip Bard, Ph.D., on "The Segmental Basis of Cortical Localization" and Dr. Robert V. Seliger, "The Rehabilitation of the Alcoholic." All are from Baltimore.—A symposium on peptic ulcer was presented before the Baltimore City Medical Society, October 4, by Drs. William F. Rienhoff Jr., Lay Martin and Ernest H. Gaither. At a meeting of the society, October 20, the speakers were Drs. Oliver S. Lloyd, "A New Type of Lag Screw for Internal Fixation of Fractures of the Neck of the Femur"; Amos R. Koontz, "Experiences with the Injection Treatment of Hernia," and Harold R. Bohlman, "Sulfanilamide in the Treatment of Gas Gangrene, Compound Fractures and Traumatic Wounds."

MICHIGAN

Hospital News.—A new hospital is under construction at the Pontiac Motor Company, Pontiac. The unit is a single story brick building, containing two, four and six bed rest wards, pharmacy, eye examination room, nurses' rest room, medical records room and a complete operating room for emergency cases. It is air conditioned and will be connected with the Pontiac personnel offices. Dr. Ethan B. Cudney, medical director for the division, will be in charge.

Society News.—Dr. Frank H. Bethell, Ann Arbor, discussed "Anemias Related to Nutritional Deficiencies with Particular Reference to Pregnancy" before the medical section of the Wayne County Medical Society, Detroit, October 14.—The Southern Division of the Wayne County Medical Society was constituted an official branch of the parent organization by action of the council, October 4. Officers include Drs. Robert H. Proud, Flat Rock, president; Maurice P. Miller, Trenton, president-elect; John W. Nagle, Wyandotte, secretary and treasurer, and William H. Honor, Wyandotte, counselor for the ensuing year. The East Side, West Side, Highland Park, Dearborn and Southern medical societies are now within the framework of the county organization.

Symposium on Industrial Health.—The Saginaw County Medical Society will present a symposium on industrial health and safety at the Bancroft Hotel, Saginaw, November 12. Included among the speakers will be:

Dr. Kenneth E. Markuson, Lansing, Function and Services of the Industrial Hygiene Bureau of the Michigan Department of Health.
Melvin First, industrial hygienist, Northeastern district, Industrial Hygiene in the Saginaw Valley.

M. A. Snell, supervising engineer, Hartford Accident & Indemnity Company, Hartford, Conn., The Economy of an Adequate Industrial Health and Safety Program.

C. Grant Watters, Detroit, Industrial Safety and the Preservation of Manpower.

Ralph L. Lee, department of public relations, General Motors Corporation, The Public Relations Value of an Adequate Industrial Health and Safety Program.

Dr. Charles F. Engel, Homestead, Pa., The Industrial Physician and His Relation to Industrial Health and Safety.

Ethel Langenberg, R.N., Detroit, The Nurse in Industry.

C. E. Etheridge, treasurer, Macklin Company, Jackson, The Manufacturer's Evaluation of Industrial Health and Safety.

H. R. Ohlheiser, industrial hygienist, laboratory of industrial hygiene and toxicology, Fidelity and Casualty Company of New York, Industrial Health and Safety and Their Relation to National Defense.

At the dinner meeting, the speakers will be Drs. Frank Novy, Saginaw, and Henry Cook, Flint, president of the county medical society and chairman of the industrial health committee of the state medical society, respectively.

MINNESOTA

Officers of State Board of Health.—Dr. Erling S. Platou, Minneapolis, was recently reelected president of the Minnesota State Board of Health and Dr. Thomas B. Magath, Rochester, was elected vice president succeeding Mr. T. G. Bell, Duluth, who retired from the board. Leo Thompson, Little Falls, has been named to succeed Mr. Bell as a member and Dr. Frederick W. Behmler, Morris, has been appointed to succeed Dr. Edward T. Fitzgerald, Morris. Other members of the board are Dr. Ruth E. Boynton, Minneapolis; F. E. Bass, C.E., Minneapolis; Dr. Albert G. Schulze, St. Paul; A. C. Kean, D.D.S., Grand Rapids, and Gustav Bachman, Pharm.D., Minneapolis. Dr. Albert J. Chesley, St. Paul, was reappointed as secretary and executive officer.

Society News.—Dr. Arnold Schwyzer presented a paper before the Minnesota Academy of Medicine, St. Paul, October 9, entitled "Ulcerative Colitis."—A symposium on diseases of the blood was presented before the Ramsey County Medical Society, St. Paul, September 30. Dr. Ralph W. Warnock discussed "The Anemias" and Dr. Emmett V. Kenefick, "Leukemias and Leukemoid Reactions."—Dr. Irvine McQuarrie, Minneapolis, discussed "The Effect of War on Civilian Health in China" before the Hennepin County Medical Society, October 23. At the meeting October 30 the speakers will be Dr. Robert G. Green on "The Typical Characters of Virus Infections" and Dr. Erling S. Platou and Robert E. Hoyt, M.S., "Human Serum in Streptococcal Infections."—Dr. Henry C. Sweany, Chicago, gave a lecture at the Mayo Clinic, Rochester, October 1, on "Age Criteria in the Pathology of Tuberculosis."

MONTANA

Division of Industrial Hygiene.—A state division of industrial hygiene has been organized at Helena, according to the *Journal-Lancet*. Created by the 1939 legislature, the division will study health conditions and occupational diseases among workers in the state, investigate sanitary conditions and enforce industrial health regulations.

NEBRASKA

Society News.—Drs. Frank P. Murphy and Philip L. Romonek addressed the Omaha-Douglas County Medical Society, Omaha, September 24, on "First Aid to the Newborn" and "Carcinoma of the Larynx" respectively. Drs. Willis H. Taylor and Charles P. Baker presented case reports on intracranial hemorrhage in the newborn and congenital heart disease in the newborn. All are of Omaha.

NEW YORK

Society News.—Dr. Charles Gilmore Kerley, New York, addressed the Dutchess County Medical Society in Poughkeepsie, October 16, on "Thyroid Gland Abnormalities in Infants and Children."—At a meeting of the Medical Society of the County of Westchester, White Plains, October 15, Dr. William P. Thompson, New York, made an address on "An Evaluation of Newer Laboratory Methods."—Speakers at a meeting of the Syracuse Academy of Medicine, October 15, included Dr. Edward C. Hughes on "The Relationship of the Thyroid and Adrenal Glands to the Toxemias of Pregnancy."

New York City

Award to Head of Infantile Paralysis Foundation.—Mr. Basil O'Connor, president of the National Foundation for Infantile Paralysis, received the Goodrich Award for Distinguished Public Service at a ceremony in the B. F. Goodrich Arena at the New York World's Fair, October 15. In accept-

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ing the award, Mr. O'Connor called it a "recognition by industry of the value of the work of the National Foundation for Infantile Paralysis to the public as a whole."

Appointments at Postgraduate Medical School.—Announcement is made of the appointment of Dr. Henry H. Ritter as executive officer of the department of traumatic surgery at New York Post-Graduate Medical School and Hospital, with the founder of the department, Dr. John J. Moorhead, remaining as consultant. Dr. George Anopol is now executive officer of the department of orthopedic surgery, succeeding Dr. Charles Ogilvy, who remains as consultant. Dr. Irving S. Wright has been made executive officer of the department of medicine, succeeding Dr. Walter G. Lough. Dr. Lough, previously professor of clinical medicine, becomes clinical professor of medicine.

NORTH CAROLINA

Ninth District Meeting.—The annual meeting of the Ninth District Medical Society was held in Mooresville, September 26. Dr. Dickinson Sergeant Pepper, Philadelphia, was the guest speaker at a banquet on "The Use of Sulfapyridine and Sulfathiazole in the Treatment of Pneumonia." Other speakers included Drs. John W. Erwin, Morganton, on "Thrombocytopenia with Leukopenia of Unknown Origin"; Carl V. Reynolds, state health officer, Raleigh, "Why a Health Department?"; James P. Rousseau, Winston-Salem, "Pituitary Adenomas"; Creighton Wrenn, Mooresville, "Some Complications of Pregnancy," and Lieut. Col. John H. Sturgeon, Fort Bragg, "The Physicians' Duties for Mobilization Under the Selective Service Act."

Memorial Hospital Dedicated.—Ceremonies dedicating the new Memorial Hospital were held in Charlotte, October 1, and the building was opened to patients October 7. Governor Clyde Hoey made the dedicatory address. Other speakers were Dr. William H. Walsh, Chicago, hospital consultant; Dr. Malcolm T. MacEachern, director of hospital activities, American College of Surgeons, Chicago, and Mr. C. Russell Shetterly, associate general counsel, Public Works Administration, Washington, D. C. The hospital has 325 beds including bassinets, and affiliated with it is the Good Samaritan Hospital with 100 beds for Negro patients. Mr. Fred M. Walker, for fourteen years general superintendent of the Duval County Hospital in Jacksonville, Fla., is administrator, and Dr. Brodie C. Nalle, Charlotte, is president and chief of the medical staff. Dr. Paul Kimmelsiel, recently associate professor of pathology at the Medical College of Virginia, Richmond, has been appointed pathologist and Dr. Allan Tuggle, instructor in radiology at Cornell University Medical College, is the radiologist. There will be a resident staff of eight physicians. Funds for the new hospital were assembled by a PWA grant of \$450,000, a \$350,000 bond issue, a subscription campaign that raised \$135,000 and contributions from a number of other sources. The present institution represents a merger of the former St. Peter's Hospital and the Good Samaritan.

OHIO

Personal.—Dr. Russell B. Crawford has been selected to head the Lakewood City Hospital, Lakewood, succeeding Miss Elizabeth Harding, who resigned, effective September 1.—Dr. Lyman F. Huffman, Cleveland, has been appointed a member of the Ohio Public Health Council to succeed Dr. Clyde L. Cummer, Cleveland, resigned.—Dr. Charles C. Crosby, Ashtabula, has been appointed health officer of Ashtabula County, succeeding Dr. Jonas L. Hurst, Dorset.

Rachford Memorial Lectures.—Dr. James S. Plant, Newark, N. J., delivered the ninth annual series of Benjamin Knox Rachford Memorial Lectures at the Children's Hospital, Cincinnati, October 17-18. Dr. Plant's subjects were "Infection Points in the Field of Behavior" and "Negativism, Its Treatment and Its Implications." The Rachford Lecture-ship was established by friends of Dr. Rachford to commemorate his many years of service to the University of Cincinnati College of Medicine and to the practice of pediatrics.

Postgraduate Day in Toledo.—The seventh annual Postgraduate Day of the University of Toledo will be presented, November 1, at the university. The guest speakers will be Drs. John S. Lockwood and Harrison F. Flippin of the faculty of the University of Pennsylvania School of Medicine, Philadelphia. Dr. Lockwood's subjects will be: History and Mode of Action of Sulfanilamide. Chemotherapy in Special Surgical Infections, Orogenic Infections and Meningitis; Septicemia; Cellulitis. Chemotherapy in Prophylaxis and Treatment of Traumatic Wounds, Pyoperic Infections and Peritonitis.

Dr. Flippin will speak on the following topics: Pharmacology, Method of Administration and Toxicity of Sulfonamides. Chemotherapy in Special Medical Infections (Urinary Tract, Scarlet Fever, Rheumatic Fever, Endocarditis, Malaria). Chemotherapy of Respiratory Disease.

PENNSYLVANIA

Personal.—Dr. George B. Woods, Washington, 90 years old, received the degree of bachelor of science from Waynesburg College in September. A member of the class of 1872, Dr. Woods left college to enter medical school.—Robert L. Harding, D.D.S., formerly of Ann Arbor, Mich., has been appointed director of the department of oral and maxillofacial surgery at the Geisinger Memorial Hospital, Danville, it is reported.

Philadelphia

Hospital News.—Mercy Hospital presented its first symposium on diseases of the rectum, October 22. Among the speakers were Drs. Collier F. Martin, Harry E. Bacon and Thomas R. Peyton.

Dinner in Honor of Retiring Teachers.—The Medical Alumni Association of Temple University sponsored a dinner at the Union League Club, October 2, in honor of Drs. Frank C. Hammond, who recently retired as professor of gynecology, and Jesse O. Arnold, who retired as professor of obstetrics. Dr. William N. Parkinson, dean of the medical school and president of the alumni association, presided; the speakers included Charles E. Beury, L.L.D., president of the university; Drs. Charles H. Henninger, Pittsburgh, then president of the Medical Society of the State of Pennsylvania; Francis F. Bortz, then president-elect of the state society; Edward L. Wilmer Krusen and William Wayne Babcock.

Pittsburgh

Personal.—Dr. Oliver E. Turner has been appointed in charge of a new health district for Allegheny County outside of Pittsburgh, with offices in the Falk Clinic.

Hospital News.—Mercy Hospital presented its annual "Mercy Day" program, September 26, with Dr. Esmond R. Long, Philadelphia, as the speaker on "Diagnosis of Chronic Diseases of the Chest in the Light of the Pathologic Anatomy."

Symposium on Vertigo.—At a meeting of the Allegheny County Medical Society, October 15, a symposium on vertigo was presented, with the following speakers: Drs. Harold L. Mitchell and John A. Malcolm, on the neurologic and medical aspects; John F. McCullough and Leslie H. Osmond, on roentgenologic interpretations; Robert J. Billings and Charles W. Fischer, the ophthalmologic point of view; Nathaniel A. Weisser, the ophthalmologic point of view; Samuel F. Grunnagle, cerebral and cerebellar aspects.—Drs. John J. McAleese and Charles F. Elterich addressed the Pittsburgh Pediatric Society, October 18, on "Use of Zinc Oxide and Oil of Cloves Paste in the Treatment of Osteomyelitis" and "Sonne Dysentery" respectively.

SOUTH CAROLINA

Society News.—Dr. Joseph Decherd Guess, Greenville, was elected president of the Piedmont Post-Graduate Clinical Assembly at the annual meeting in Anderson in September, succeeding Dr. Edgar A. Hines, Seneca. Vice presidents elected were Drs. Joseph M. Feder, Anderson; James C. Harper, Greenwood; Benager C. Teasley, Hartwell, Ga., and Robert A. Ross, Durham, N. C. Dr. Archer L. Smethers, Anderson, was reelected secretary.

TENNESSEE

Society News.—Dr. Hedy S. Shoulders, Nashville, addressed the Davidson County Medical Society, Nashville, September 3, on "Gastrointestinal Roentgenology: An Analysis of Findings Over a Twenty Year Period." Speakers September 10 were Drs. Duncan E. and Rollin A. Daniel Jr. on "Fractures of the Shaft of the Humerus."—At a meeting of the Chattanooga and Hamilton County Medical Society, September 5, the speakers were Drs. Samuel H. Long on "Allergy and the Eye, Ear, Nose and Throat," and Oliver L. Von Canon, "Anemias of Childhood."—At a meeting of the Dyer, Lake and Crockett Counties Medical Society, Dyer, September 4, the speakers, all of Dyersburg, were Drs. Jesse Paul Baird, on "Unusual Types of Intestinal Obstruction in Infancy"; Orren B. Landrum, "Parasagittal Meningioma and Multiple Myeloma of the Skull," and William F. Anderson, "Pernicious Anemia."

TEXAS

Public Health Meeting.—The annual meeting of the Texas Public Health Association was held in Fort Worth, September 30 to October 2, under the presidency of Dr. George A. Gray, Sweetwater. The speakers included Drs. Joseph W. Mountin, U. S. Public Health Service, Washington, D. C., on "The Complications of Regional Differences in Texas"; Frederick R. Lummis, Houston, "The Present Public Health Status of Heart Disease," and Frances C. Rothert, regional consultant, U. S. Children's Bureau, New Orleans, "Recent Developments in Maternal and Child Health Programs." Dr. Clarence Burke Brewster, Fort Worth, was chosen president-elect.

VIRGINIA

Annual Lectures in Richmond.—The third annual series of lectures has been announced by the Richmond Academy of Medicine. The first lecture was presented October 22 by Rolland J. Main, Ph.D., Richmond, on "Integration and Terminology of the Endocrine System." The remainder of the series will be:

- Dr. Harry B. Van Dyke, New Brunswick, N. J., Physiological Studies of the Anterior Pituitary Gland, November 19.
- Edgar Allen, Sc.D., New Haven, Conn., Puberty and the Menstrual Cycle, January 21.
- Dr. Willard M. Allen, St. Louis, Endocrine Therapy of Abnormal Menstruation and the Menopause, February 4.
- Dr. Edwin C. Hamblen, Durham, N. C., Sterility and Pregnancy from an Endocrinological Standpoint, February 18.
- Dr. John Eager Howard, Baltimore, Androgens and Androgenic Therapy, March 11.

GENERAL

Sedgwick Medal Awarded Posthumously to Dr. Zinsser.—The Sedgwick Memorial Medal of the American Public Health Association was awarded posthumously, October 8, to Dr. Hans Zinsser. At the time of his death, Dr. Zinsser was professor of bacteriology and immunology at Harvard Medical School, Boston.

Health Council Agencies Move.—The National Tuberculosis Association is moving its offices during October from Rockefeller Center to 1790 Broadway. According to the October *Bulletin* of the association, other members of the National Health Council that have also been in Rockefeller Center will move to the Broadway address.

Refresher Series on Radiology.—The Radiological Society of North America, Inc., has announced a refresher series to be conducted at the Hotel Statler, Cleveland, December 1-6. It will be the third annual course to be offered as a part of the annual meeting of the society. Additional information may be obtained from Dr. Lewis G. Allen, 905 North Seventh Street, Kansas City, Kan.

Fellowship Fund in Memory of Dr. Brown.—Friends of the late Dr. Lawrason Brown, for many years head of the Trudeau Sanatorium, Saranac Lake, N. Y., have established the Lawrason Brown Memorial Fund to finance one or more fellowships for research in diseases of the chest. The fund will be managed by the Saranac Lake Society for the Control of Tuberculosis, and if at any time that organization should cease to exist the management of the fund will be offered first to Johns Hopkins University. The present committee is composed of Drs. Leroy U. Gardner and James Woods Price, Saranac Lake; Louis Hamman, Baltimore; Esmond R. Long, Philadelphia; David R. Lyman, Wallingford, Conn., and William P. Thompson, New York.

Brinkley Loses Libel Suit.—The New York Times for October 15 noted that the U. S. Supreme Court denied Dr. John R. Brinkley a review of the decision of the United States Fifth Circuit Court of Appeals on his case against Dr. Morris Fishbein, Editor of THE JOURNAL. The basis of the suit was an article in *Hygeia* entitled "Modern Medical Charlatans," and reference was made to the denial of the Fifth Circuit Court of Appeals in New Orleans in THE JOURNAL, April 27, page 1682. The case was originally tried in the Federal Court of the Western District of Texas, in which the jury returned a verdict for the defendant (THE JOURNAL, April 8, 1939, p. 1346). Brinkley then appealed to the Circuit Court of Appeals and subsequently to the Supreme Court. Both appeals resulted in denial of reviews.

Fellowships in Psychoanalysis.—The Boston Psychoanalytic Institute announces three additional Sigmund Freud Memorial Fellowships for Psychoanalytic Training, to begin September 1941. These fellowships are open to graduates of a recognized medical school who have had at least one year of general hospital training and two years' work in psychiatry and covers tuition fees only. One additional fellowship for training in applied nontherapeutic psychoanalysis will be open

to those who have a doctor of philosophy degree or an equivalent degree in the field of anthropology, sociology, pedagogy and so on. Further information may be obtained from Dr. Moses Ralph Kaufman, chairman of the educational committee, Boston Psychoanalytic Institute, 82 Marlborough Street, Boston. Applications close on February 1.

Bequests and Donations.—The following bequests and donations have recently been announced:

- University of Pennsylvania, a trust fund of \$40,000 and Rush Hospital, Philadelphia, \$5,000 for treatment and study of diseases of the digestive system by the will of Mrs. Mary Hawley Thompson, Media, Pa.
- Jewish Hospital, Philadelphia, \$198,519 to build a nurses' home as a gift from the late Mary S. Hirsh.
- Emergency Hospital, Washington, D. C., \$50,000 by the will of the late Mrs. May Palmer Depew.
- Presbyterian, Northeastern, Episcopal and Frankford hospitals, Philadelphia, and Abington Memorial Hospital, Abington, Pa., \$10,000 each by the will of the late Charles P. Cochran.
- Presbyterian Hospital, Chicago, \$10,000 by the will of the late Warren A. Lamson.
- Lenox Hill Hospital, New York, \$3,000 by the will of the late Mrs. Ida Welz.
- New York Medical College and Flower and Fifth Avenue Hospitals, \$242,531 from the estate of Mrs. Helen S. Case.
- Germantown Hospital, Germantown, Pa., \$10,000 to endow two beds, by the will of Miss Mary McCullagh.
- International Cancer Research Foundation, Philadelphia, will receive the greater part of an estate of \$265,000 left by Mrs. Gertrude Wellington.

Pan American Congress of Ophthalmology.—Permanent organization of a Pan American Congress of Ophthalmology was effected at the first meeting of the congress in Cleveland, October 11-12. Dr. Harry S. Gradle, Chicago, was elected president; Dr. Conrad Berens, New York, executive secretary for North America and Dr. Moacyr E. Alvaro, São Paulo, Brazil, for the Latin American countries. Vice presidents elected were: Drs. Frank Brawley, Chicago; Samuel Hanford McKee, Montreal, Canada; Edward Jackson, Denver; Tomás R. Yanes, Havana, Cuba; A. Vasquez-Barriera, Montevideo, Uruguay; José Pereira Gomes, São Paulo, Brazil, and Enrique Demaria, Buenos Aires, Argentina. It is expected that the next congress will be held in Montevideo in 1943. About twenty Latin Americans attended the congress, representing Brazil, Costa Rica, Cuba, Chile, Colombia, Guatemala, Panama and Puerto Rico. The congress was sponsored by the American Academy of Ophthalmology and Otolaryngology.

Society of Obstetrics and Gynecology.—The Pacific Coast Society of Obstetrics and Gynecology will hold its ninth annual meeting in San Francisco, November 6-9, under the presidency of Dr. Alice F. Maxwell, San Francisco. Papers will be presented by:

- Dr. Gordon G. Thompson, Seattle, Wash., Fibroids in Pregnancy.
- Dr. Arthur B. Nash, Victoria, B. C., Manchester Operation.
- Dr. Paul A. Glibe, San Francisco, Dyspareunia and Related Somatic Manifestations.
- Dr. John C. Irwin, Los Angeles, Extraperitoneal Cesarean Section: A Modification of Latzko Technic with Report of Thirty Cases.
- Dr. Donald G. Tollefson, Los Angeles, Anesthesia and Analgesia in Labor.
- Drs. William Benbow Thompson and Emil J. Krahulik, Los Angeles, Fetal Resuscitation.
- Dr. Hervey K. Graham, San Diego, Routine Chest Roentgenograms in Pregnancy: A Study Based on 800 Consecutive Cases.
- Dr. Olin M. Holmes, San Mateo, High Protein Diet in Pregnancy.
- Drs. Daniel G. Morton and Charles Thomas Hayden, San Francisco, Incidence of Ovulation as Determined by Endometrial Biopsies.
- Dr. Bernard J. Hanley, Los Angeles, Pregnancy and Syphilis.
- Dr. Erle Henriksen, Los Angeles, Resection of the Superior Hypogastric Plexus.

Government Services

Applications Closed for Temporary Medical Officers
—Permanent Positions Still Open

The U. S. Civil Service Commission announces that applications are closed for temporary and part time civilian medical officers in connection with expansion of the U. S. Army, as enough have been received to supply prospective needs.

The commission calls attention to the fact, however, that there is an urgent need for medical officers and senior and associate medical officers to fill permanent positions in other agencies. These positions pay from \$3,200 to \$4,600 a year and include fourteen specialized branches of medicine. There is also need for junior medical officers at St. Elizabeths Hospital, Washington, D. C., at \$2,000 a year. Information and application forms may be obtained at the office of the board of civil service examiners at any first or second class postoffice or from the U. S. Civil Service Commission, Washington, D. C., or from any of the commission's district offices.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 28, 1940.

The Bombing of London Hospitals

The indiscriminate bombing of London has involved several hospitals, as many as three in one night. In one case a high explosive went straight through the glass dome, crashed through a five story staircase and landed on the ground floor. Fortunately there was only one casualty, a doctor who was working in his office. The desk in front of him disappeared and he remained perched on his chair near the wall with a 50 feet chasm in front of him. Despite a badly cut head he was rescued by firemen alive. When nurses opened the doors of the various wards they found a yawning abyss in front of them. The staff worked heroically getting 100 patients to the ground floor by an emergency method. Some were slid down a wooden ramp which had been put up only the day before. Others were carried down fire escapes. Among the patients were thirty casualties from previous air raids. Two more bombs fell on the works department. Though stricken, the hospital carried on. While the patients were being evacuated, four air raid casualties from the area were dealt with and one serious operation was performed.

In another attack doctors and defense workers carried on in the street while bombs were falling and a direct hit occurred on a nearby shelter containing 1,000 people. The injured were attended to in the street in the glare of the flame-lit sky and transferred to waiting ambulances while the bombers droned above. Among fourteen killed by this one bomb were mothers and children. Working in the light of fires and carefully shielded torches, doctors improvised tourniquets and dressed wounds.

The largest of the hospitals, the London, has been bombed several times. The two hundredth anniversary of its foundation has just been passed. The king sent a message of congratulation in which he expressed admiration for the way in which the medical and nursing staffs are carrying on in spite of the repeated bombing. He visited the hospital and, with the queen, they walked through the four wards set aside for air raid casualties, where injured men and women told them of their adventures.

The hospitals are working under new conditions. Their ordinary patients have been removed to safer localities and they are being used for the treatment of air raid casualties, which are dealt with in the first instance by an ambulance service organized for the purpose before the outbreak of war. Great demands have been made on this service as well as on the auxiliary fire department organized to cooperate with the regular fire department in dealing with the fires produced by incendiary bombs. The experiences of the last few weeks have shown the soundness of these services, which consist of volunteers trained for the purpose. They have shown an excellent spirit and worked with great devotion. They have suffered air-raid casualties, of which some have been fatal. The ambulance service has had to transport many air raid casualties to the hospital and in spite of the blackout the average time taken to reach a casualty has been only seven minutes from the receipt of the call. Casualties among the personnel have been numerous. The London County Council is providing for persons rendered homeless by air raids rest centers, bedding and hot meals.

Four Physicians Killed in London Air Raids

During the daily indiscriminate bombing of London, physicians, like other citizens, carry on. At a meeting of the London Insurance Committee (the body which controls the administration of panel practice) it was reported that as the result of air raids the offices of many London insurance practitioners had

been demolished or put out of action. Four physicians have lost their lives. In one case the wife, daughter and maidservant of the physician were killed with him. An appeal made to physicians to stand by their unfortunate colleagues and carry on their work had met with the readiest response. Panel physicians had agreed to attend any insured persons, whether on their lists or not. In view of the depletion by war service of physicians available for civilian service, it was decided to increase the maximum of persons allowed on a physician's list by 5 per cent.

United States Medical Unit in England

An advance party of an American hospital foundation has arrived in England and will proceed to London after seeing some hospital arrangements in the Northwest. Mr. Harry Platt, one of the Ministry of Health's consultants in orthopedic surgery, who has acted as link between the ministry and trustees in America, states that American sympathizers with Britain who want to help in the treatment of war injuries have established a foundation, duly incorporated as a charity, like the Rockefeller and Carnegie trusts, with the object of providing, if need be, 1,000 beds free to this country. The leading spirit is Dr. Philip Wilson, professor of orthopedic surgery at Columbia University College of Physicians and Surgeons, who was in France in 1915 with the American Ambulance, joined the Harvard unit at a British hospital and later served with the American Expeditionary Forces. Dr. Wilson enlisted the help of American well wishers in many towns for his scheme and funds came in rapidly. The financing of the unit is based on the Allied Relief Fund, which theoretically is available for any form of humanitarian work, feeding, medical and so on. The president is Mr. Winthrop Aldrich and the trustees include Mr. A. P. Sloan of General Motors Corporation and Mrs. Alfred Dupont.

Dr. Wilson leads an advance party of seven surgeons, three nurses and two secretaries. The British Ministry of Health, which is responsible for the Emergency Casualty Services, will give the visitors the opportunity of helping in one of its hospitals. If the war becomes more intense and there are many casualties, reinforcements will be sent from America. Possibly the Ministry of Health could then place a hospital at their disposal, but at present our casualties are being steadily discharged from the hospitals and air raid casualties are dispersed all over the country, so a central American hospital is not needed. The members of the party on their arrival could scarcely believe their eyes when they saw the port so completely undamaged and normal. They brought two truckloads of surgical instruments and have \$250,000 for a year's working.

Empty Beds in the War Hospitals

How very different the attack by air on Britain has turned out from what was expected was shown in the House of Commons by Mr. Churchill. More than 150,000 beds were got ready but are still empty. During August 1,075 civilians were killed in Great Britain and a slightly greater number were seriously injured. For a population of 45,000,000 these losses were very small.

Marriages

FRANCIS EDWARD O'NEILL, Sanderson, Texas, to Miss Estella Schellhase of San Antonio, June 25.

BENJAMIN N. SEARCY, Rising Sun, Ind., to Miss Dorothy Means, in Lawrenceburg, June 9.

HAROLD C. BERNSTEIN, Los Angeles, to Miss Barbara Rothchild of Chicago in September.

SIDNEY STILLMAN, New Orleans, to Miss May Goldie Setzer, at Jacksonville, Fla., June 16.

EDWIN LEVER LAME to Miss Mary Massey Perkins, both of Philadelphia, September 7.

WILLIAM A. STUCKEY to Miss Mary Frances Tucker, both of Sumter, S. C., recently.

Deaths

Wilfred Thomason Grenfell, St. Anthony, Newfoundland, founder of the Labrador Medical Mission, died, October 9, at his home in Charlotte, Vt., of heart disease, aged 75. Dr. Grenfell was born Feb. 28, 1865, in England. He was a licentiate of the Royal College of Physicians of London and member of the Royal College of Surgeons of England in 1888. After a period as house physician at London Hospital, he organized a hospital service for the fisheries of the North Sea and cruised with fishermen from the Bay of Biscay to Iceland, establishing homes for them and providing mission services at sea. In 1892 he went to Newfoundland on a small boat fitted out with hospital supplies. That voyage decided Dr. Grenfell's career. During the following winter the governor of Newfoundland invited him to take up regular work along the Labrador coast. Materials were sent out for a hospital unit, to be established 200 miles farther north, and from this grew the International Grenfell Association, which by 1937 had six hospitals, seven nursing stations, four hospital ships, four orphanage boarding schools, fourteen industrial centers, three agricultural stations, twelve clothing distribution centers, a supply schooner and a lumber mill. Dr. Grenfell served in the World War as a major in charge of the medical unit sent by Harvard University. He received honors from colleges in United States and England, among others a Doctor of Laws from Williams College, McGill University, Middlebury College, Princeton, Bowdoin and St. Andrews, and a Master of Arts degree from Harvard. He was awarded a fellowship and the Murchison Bequest of the Royal Geographical Society, a gold medal of the Academy of Social Sciences of North America, and the Livingstone Gold Medal of the Scottish Geographical Society. He was a fellow of the American College of Surgeons. In 1927 he was knighted by King George V; in 1929 he was installed a rector of St. Andrews University in Scotland. He was the author of "Vikings of Today," "Harvest of the Sea," "Off the Rocks," "Adrift on an Ice Pan," "Down to the Sea," "A Labrador Doctor" (autobiography), "Northern Neighbors" and many others.

Ernest A. Pribram ♂ Chicago; Deutsche Universität Medizinische Fakultät, Prague, Czechoslovakia, 1903; formerly professor of pathology at the University of Vienna and assistant professor of pathology at Rush Medical College; clinical professor of clinical microscopy and at various times professor of bacteriology and preventive medicine and professor of medicine at Loyola University School of Medicine; assistant, later assistant director and director of the State Serum Institute, Vienna, from 1907 to 1926; member of the American Association of Pathologists and Bacteriologists, Society of American Bacteriologists and the American Society of Clinical Pathologists and other scientific societies; member of the International Society of Microbiology and in 1930 president of the American Committee on Nomenclature in Paris; corresponding member of the Gesellschaft der Aerzte, Vienna; Deutsche Chemische Gesellschaft, Berlin, and the Austrian Cancer Research Society, Vienna; pathologist to St. Elizabeth's Hospital, Chicago, and St. Therese's Hospital, Waukegan; aged 61; died, September 14, in St. Joseph's Hospital, Lewiston, Mont., of injuries received in an automobile accident.

Alexander Swanson Begg ♂ Boston; Drake University College of Medicine, Des Moines, Iowa, 1907; instructor in pathology at his alma mater from 1907 to 1909, assistant professor of pathology, histology and embryology, 1909-1910, and professor of histology and embryology from 1910 to 1913; teaching fellow at Harvard Medical School, 1911-1912, and at various times instructor in comparative anatomy, dean of the graduate school of medicine and demonstrator in anatomy and instructor of histology; research associate at the Carnegie Institution, 1915-1916; dean and Waterhouse professor of anatomy at the Boston University School of Medicine; served during the World War; member of the executive council of the Association of American Medical Colleges from 1929 to 1932; past president of the Norfolk District Medical Society; member and formerly on the executive committee of the National Board of Medical Examiners; member of the American Association of Anatomists; since 1935 secretary of the Massachusetts Medical Society; recently state chairman of the medical preparedness committee in Massachusetts; aged 59; died, September 26, of coronary thrombosis.

William Augustus Howe, Phelps, N. Y.; College of Physicians and Surgeons, medical department of Columbia College, New York, 1888; member of the Medical Society of the State

of New York; past president of the Ontario County Medical Society; formerly county coroner; for many years health officer; deputy commissioner of health of New York State from 1910 to 1914; chief of the medical inspection bureau of the state education department from 1915 to 1934; director, division of communicable diseases, state department of health, in 1909; past president of the child hygiene section of the National Education Association; one of the founders of the American Association of School Physicians, of which he was president, 1927-1928; in 1929 was awarded the Ling Foundation Medal for distinguished service to child health; editor of the *School Physicians' Bulletin* from 1930 to 1937; aged 78; died, September 11, in the Clifton Springs (N. Y.) Sanitarium, of cerebral thrombosis and arteriosclerosis.

Joseph McIver ♂ Philadelphia; University of Texas School of Medicine, Galveston, 1912; member of the American Neurological Association; past president of the Philadelphia Neurological Society; commissioned lieutenant in the U. S. N. R. F. in 1917, serving as neuropsychiatrist at the United States Naval Hospital, League Island, until June 1919; formerly instructor and associate in neurology at the University of Pennsylvania School of Medicine; chief neurologist to Misericordia, Fitzgerald-Mercy and Nazareth hospitals; chief of the neuropsychiatric staff of the Philadelphia General Hospital; neuropsychiatrist to the House of Detention of Philadelphia; aged 53; died, September 7, in Bryant, Texas, following an operation for appendicitis.

Abraham Louis Levin ♂ New Orleans; Medical Department of Tulane University of Louisiana, New Orleans, 1907; clinical professor of medicine, Louisiana State University School of Medicine; member of the National Gastroenterological Association; past president of the Louisiana Society of Gastroenterology; served during the World War; on the staffs of the Touro Infirmary, Hotel Dieu and the Charity Hospital; aged 59; died, September 15, of coronary occlusion.

Hermann J. G. Koobs ♂ Rogers, Ark.; Northwestern University Medical School, Chicago, 1902; past president of the South Dakota State Medical Association; member of the House of Delegates of the American Medical Association in 1919; member of the American Academy of Ophthalmology and Otolaryngology; aged 71; died, September 3, of diverticulitis with perforation of the colon.

Charles Robinson Hume, Anadarko, Okla.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1874; member of the House of Delegates of the American Medical Association, 1918-1919; member and past president of the Oklahoma State Medical Association; past president of the Caddo County Medical Society; formerly county health officer; aged 92; died, August 9.

Charles Spalding Hunt ♂ New York; Columbia University College of Physicians and Surgeons, New York, 1905; professor of anesthesia at the New York Polyclinic Medical School and Hospital; member of the American Society of Anesthetists; on the staff of St. John's Hospital and the Long Island College Hospital; aged 65; died, September 9, in the Polyclinic Hospital.

Oscar Richardson, Lakeville, Mass.; Harvard Medical School, Boston, 1900; member of the Massachusetts Medical Society and the American Association of Pathologists and Bacteriologists; at one time associate medical examiner for Suffolk County; formerly assistant pathologist at the Massachusetts General Hospital, Boston; aged 80; died, August 28.

Thomas Clifford Neal, Anniston, Ala.; Emory University School of Medicine, Atlanta, Ga., 1918; member of the Medical Association of the State of Alabama; at one time district health commissioner of unit number 2, composed of Catoosa, Whitfield, Murray and Gordon counties in Georgia; aged 51; died, September 2, in St. Louis of pulmonary tuberculosis.

Robert Phillips Munson, Medina, N. Y.; Columbia University College of Physicians and Surgeons, New York, 1922; formerly secretary of the Orleans County Medical Society; served during the World War; aged 43; on the staff of the Medina Memorial Hospital, where he died, September 11, of cirrhosis of the liver.

Alexander Ross Alguire, Cornwall, Ont., Canada; McGill University Faculty of Medicine, Montreal, Que., 1905; L.R.C.P., of London, England, and M.R.C.S., England, 1908; fellow of the American College of Surgeons; on the staffs of the Cornwall General Hospital and Hotel Dieu Hospital; aged 55; died, August 29.

George Marion Blickensderfer ♂ Denver; Denver and Gross College of Medicine, 1903; an Affiliate Fellow of the American Medical Association; past president of the staff of

the Children's Hospital; aged 68; died, September 8, of thrombosis of the femoral artery, myocarditis and arteriosclerosis.

Everett E. Watson • Salem, Va.; University College of Medicine, Richmond, 1912; member of the American College of Chest Physicians and the American Association for Thoracic Surgery; medical director of the Mount Regis Sanatorium; aged 52; died, August 3, of pulmonary tuberculosis.

Miles Guthrie Varian, Los Angeles; University of Pennsylvania Department of Medicine, Philadelphia, 1901; aged 67; died, August 12, in the Huntington Memorial Hospital, Pasadena, Calif., of incisional hernia, partial intestinal obstruction, bronchopneumonia and acute myocarditis.

Frederick Rice Waldron, Ann Arbor, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1901; past president of the Washtenaw County Medical Society; on the staff of St. Joseph's Mercy Hospital; aged 64; died, August 30, of coronary heart disease.

Addison May Rothrock, Kerrville, Texas; University of Pennsylvania Department of Medicine, Philadelphia, 1893; veteran of the Spanish-American and World wars; aged 70; died, September 1, in the Veterans Administration Facility, Legion, of tuberculosis.

Theodore John Redelings, San Diego, Calif.; Chicago Medical College, 1887; member and past president of the State Medical Society of Wisconsin; past president of the Marinette County Medical Society; at one time city health officer; aged 77; died, September 4.

Edmund Francis Walsh, Boston; Harvard Medical School, Boston, 1908; member of the Massachusetts Medical Society; served in various capacities on the staff of the Boston City Hospital; aged 58; died, August 20, of coronary occlusion, while bathing.

Albert Salomon Hoheb • Rutherford, N. J.; University of Maryland School of Medicine, Baltimore, 1921; served during the World War; aged 47; on the staff of the Passaic (N. J.) General Hospital, where he died, September 13, of chronic myocarditis.

Yetta Scheftel, Chicago; Rush Medical College, Chicago, 1921; clinical instructor of neurology at her alma mater; aged 56; on the staff of the Women's and Children's Hospital, where she died, September 9, of peritonitis and carcinoma of the uterus.

James Krom • Saugerties, N. Y.; College of Physicians and Surgeons, medical department of Columbia College, New York, 1892; for many years health officer and medical inspector of the schools; aged 71; died, September 4, in the Kingston (N. Y.) Hospital.

George Pinckney Reid, Forest City, N. C.; University College of Medicine, Richmond, 1895; member of the Medical Society of the State of North Carolina; at one time bank president; formerly county coroner; aged 78; died, September 8.

Frederick Sumner Briggs • Brandon, Vt.; Columbia University College of Physicians and Surgeons, New York, 1907; served during the World War; formerly member of the school board and health officer; aged 58; died, September 8.

Thomas William Fields, Dresden, Tenn.; Kentucky School of Medicine, Louisville, 1890; University of Nashville (Tenn.) Medical Department, 1902; formerly mayor; served during the World War; aged 76; died, September 4, of carcinoma.

Danforth C. Cowles • Fullerton, Calif.; University of Minnesota Medical School, Minneapolis, 1901; veteran of the Spanish-American War; past president of the Orange County Medical Society; aged 66; died, August 28.

Albert Frederick Hanlon, Greenwich, Conn.; Hahnemann Medical College and Hospital of Philadelphia, 1907; on the staff of the Greenwich Hospital; aged 57; died, September 9, of arteriosclerosis and coronary occlusion.

William Simmons, Lakeville, Conn.; Long Island College Hospital, Brooklyn, 1891; at one time on the staffs of the Brooklyn Eye and Ear, Kings County and Jewish hospitals, Brooklyn; aged 80; died, September 6.

Louis Gilbert Newman, Westfield, N. J.; New York Homeopathic Medical College and Hospital, 1895; aged 67; died, September 9, in the Muhlenberg (N. J.) Hospital of arteriosclerosis and bronchopneumonia.

Eugene Chester Seawright, Fayetteville, Ga.; University of the South Medical Department, Sewanee, Tenn., 1904; formerly mayor; aged 59; died, September 2, in a hospital at Atlanta of carcinoma of the pancreas.

Carroll Colby Burpee, Malden, Mass.; Boston University School of Medicine, 1896; served during the World War; formerly chairman of the board of health; aged 67; died, September 10, of cardiac decompensation.

Boris Gordon Glasgow, Bridgeport, Conn.; University of Moscow Faculty of Medicine, Moscow, Russia, 1896; served in the Japanese, Balkan and World wars; aged 71; died, September 6, in St. Vincent's Hospital.

Franklin Pierce Russell, Akron, Ohio; Charity Hospital Medical College, Cleveland, 1880; aged 87; died, September 5, in the City Hospital of coronary thrombosis and hemorrhage due to varicose veins of the larynx.

Burton Clarence Rumbel, Conyngham, Pa.; Medico-Chirurgical College of Philadelphia, 1905; member of the Medical Society of the State of Pennsylvania; aged 65; died, September 3, of cardiorenal disease.

Bartholomew Maxwell Howley • New Brunswick, N. J.; University of the City of New York Medical Department, 1894; formerly on the staffs of the Middlesex and St. Peter's hospitals; aged 69; died, September 2.

Clarence Abraham Ihle, Dayton, Ohio; Medical College of Ohio, Cincinnati, 1902; veteran of the Spanish-American War; aged 62; died, September 7, in the Miami Valley Hospital of coronary occlusion.

Ludwig Oulmann • New York; Julius-Maximilians-Universität Medizinische Fakultät, Würzburg, Bavaria, 1898; on the staff of the Lenox Hill Hospital; aged 65; died, September 16, of heart disease.

George Bruce Barrow, Staunton, Va.; Medical College of Virginia, Richmond, 1910; member of the Medical Society of Virginia; on the staff of the Western State Hospital; aged 55; died, September 1.

Patterson East, Lafayette, Tenn.; University of Tennessee Medical Department, Nashville, 1891; member of the Tennessee State Medical Association; aged 77; died, August 25, in a hospital at Nashville.

William David Peckham • Utica, N. Y.; Baltimore Medical College, 1897; at one time state senator; formerly health officer and coroner; aged 65; died, September 9, of coronary thrombosis.

Louis W. Satterlee, Alexandria, Minn.; Hahnemann Medical College and Hospital, Chicago, 1894; for many years health officer; aged 84; died, August 30, of cerebral hemorrhage and arteriosclerosis.

James Huff McCurdy, Springfield, Mass.; University of the City of New York Medical Department, 1893; aged 74; died, September 4, in the Springfield Hospital of carcinoma of the bladder.

Jennie A. Beardsley • Chicago; College of Physicians and Surgeons, Keokuk, Iowa, 1895; formerly on the staffs of the Jackson Park and Englewood hospitals; aged 73; died, September 13.

Abram Everett Frye, Youngstown, Ohio; College of Medicine and Surgery, Chicago, 1903; member of the Ohio State Medical Association; aged 69; died, September 3, of arteriosclerosis.

Arthur C. Byas, Memphis, Tenn.; Meharry Medical College of Walden University, Nashville, 1914; aged 57; died, July 28, in the Collins Chapel Connectional Hospital of acute gastritis.

Frank Marion Hall, Sylvan Beach, N. Y.; Baltimore Medical College, 1897; town health officer and school physician; aged 68; died, September 6, in the Main Street Hospital, Oneida.

Kristian Egilsrud, Minneapolis; Kongelige Frederiks Universitet Medisinske Fakultet, Oslo, Norway, 1892; aged 72; died, August 31, of pulmonary embolus and carcinoma of the tongue.

Theodore Julius Yetina Miller, Fords, N. J.; Long Island College of Medicine, Brooklyn, 1934; member of the Medical Society of New Jersey; aged 31; died, September 4.

John Duff McBarron • New York; College of Physicians and Surgeons, medical department of Columbia College, New York, 1892; aged 73; died, August 25, in St. Luke's Hospital.

Henry George Cameron, Weyburn, Sask., Canada; McGill University Faculty of Medicine, Montreal, Que., 1924; on the staff of the Weyburn Mental Hospital; aged 44; died, August 6.

Matthew Bunyan Cameron, Eutaw, Ala.; Medical College of Alabama, Mobile, 1886; member of the Medical Association of the State of Alabama; aged 79; died, August 25.

George Benjamin Baylis Jr., Collins, Miss.; University of Tennessee Medical Department, Nashville, 1925; aged 43; died, August 27, in the Methodist Hospital, Hattiesburg.

John Riordon Ⓢ Rutherford, N. J.; University of Buffalo School of Medicine, 1893; for many years on the staff of St. Mary's Hospital, Passaic; aged 72; died, September 2.

Albert P. Kittle, Newton, Ill.; Barnes Medical College, St. Louis, 1904; aged 69; died, September 12, in the Olney (Ill.) Sanitarium of myocarditis and endocarditis.

Rudolph Angus Nichols Sr., Richmond, Va.; Medical College of Virginia, Richmond, 1895; member of the Medical Society of Virginia; aged 67; died, September 6.

Enoch Wilson Baxter, Moyock, N. C.; College of Physicians and Surgeons, Baltimore, 1887; member of the Medical Society of Virginia; aged 79; died, August 10.

Clarence Edward Ressler, Anthony, Kan.; Hahnemann Medical College and Hospital, Chicago, 1896; aged 68; died, July 16, of arteriosclerosis and hypertension.

E. Agnes Scott Brandon, Denver; Denver College of Physicians and Surgeons, 1909; member of the Colorado State Medical Society; aged 76; died, August 13.

Isaiah Frank, New York; New York University Medical College, New York, 1898; aged 64; died, September 14, in the Flushing (N. Y.) Hospital of pneumonia.

Henry Joseph Niebauer, Madison, Wis.; University of Wisconsin Medical School, Madison, 1934; aged 30; was drowned, August 20, in Lake Mendota.

Stephen Yerkes Van Meter, Los Angeles; University and Bellevue Hospital Medical College, New York, 1904; aged 64; died, July 10, of coronary thrombosis.

Judson N. Woodworth, Santa Monica, Calif.; Hahnemann Medical College and Hospital, Chicago, 1878; Civil War veteran; aged 97; died, August 20.

John McE. Ward, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1891; aged 77; died, August 30, in the Jewish Hospital.

Anthony White, Greenville, S. C.; Atlanta (Ga.) Medical College, 1894; member of the South Carolina Medical Association; aged 70; died, August 21.

Charles Ware, Orange City, Fla.; College of Physicians and Surgeons, medical department of Columbia College, New York, 1883; aged 87; died, August 29.

Linwood H. Dorr, Dresden Mills, Maine; University of Vermont College of Medicine, Burlington, 1889; aged 74; died, July 13, of chronic nephritis.

Philip A. Hoffmann, Campbellsport, Wis.; State University of Iowa College of Medicine, Iowa City, 1887; aged 87; died, August 29, of bronchiectasis.

Henry Bowen Frazier, Bluefield, Va.; College of Physicians and Surgeons, Baltimore, 1897; aged 68; died, August 9, in the Bluefield Sanitarium.

Frank L. Van Gorder, Coffeyville, Kan.; University Medical College of Kansas City, Mo., 1907; aged 73; died, August 20, at Torch Lake, Mich.

George Houghton Clapp Ⓢ Erie, Pa.; Jefferson Medical College of Philadelphia, 1907; served during the World War; aged 56; died, August 21.

Anton Carl Klamt, Chicago; Northwestern University Medical School, Chicago, 1912; aged 56; died, September 4, of coronary occlusion.

James Bray, Toronto, Ont., Canada; M.B., University of Toronto Faculty of Medicine, 1884, and M.D., 1885; aged 85; died, September 6.

Martin Van Buren Fried Turley, Tracy, Calif.; Central College of Physicians and Surgeons, Indianapolis, 1885; aged 82; died, July 28.

Daniel Logan Stewart, Thamesville, Ont., Canada; Western University Faculty of Medicine, London, 1916; aged 47; died, August 20.

James Edmund Mabey, Odessa, Ont., Canada; Queen's University Faculty of Medicine, Kingston, 1887; aged 89; died, August 20.

Eathan Henry Marcellus, Iroquois, Ont., Canada; Queen's University Faculty of Medicine, Kingston, 1895; aged 67; died, August 31.

Leonard Jennett Simpson, Toronto, Ont., Canada; University of Toronto Faculty of Medicine, 1907; aged 58; died, August 18.

William Alexander Hargis, Donelson, Tenn.; Vanderbilt University School of Medicine, Nashville, 1892; aged 73; died, August 18.

Solomon Rothman, New York; University and Bellevue Hospital Medical College, New York, 1905; aged 56; died, August 28.

John Joseph Timlin, Old Forge, Pa.; Albany (N. Y.) Medical College, 1888; aged 81; died, August 20, of gastric carcinoma.

Charles Francis Dunfield, Windsor, Ont., Canada; Western University Faculty of Medicine, London, 1911; aged 55; died, August 2.

William E. Gill, Norwalk, Ohio; Pulte Medical College, Cincinnati, 1877; aged 85; died, September 6, of aortic insufficiency.

John Sherman Appleman, Chicago; Bellevue Hospital Medical College, New York, 1885; aged 76; died, September 12.

Carol Thelma Coolidge Stanton, Los Angeles; College of Medical Evangelists, Los Angeles, 1924; aged 40; died, July 18.

William Wesley Fitzgerald Ⓢ Stockton, Calif.; Jefferson Medical College of Philadelphia, 1895; aged 72; died, July 7.

Jefferson Davis Nifong, Long Beach, Calif.; Beaumont Hospital Medical College, St. Louis, 1893; aged 77; died, July 13.

Felix Tircuit, Marrero, La.; University of Louisiana Medical Department, New Orleans, 1878; aged 90; died, August 14.

John A. Toliver, French Lick, Ind.; University of Louisville (Ky.) Medical Department, 1893; aged 86; died, August 8.

Joseph Desgagne, Bagotville, Que., Canada; Trinity Medical College, Toronto, Ont., 1902; aged 70; died, August 16.

Theodore M. Johnson, West Pittston, Pa.; Hahnemann Medical College of Philadelphia, 1878; aged 86; died, August 20.

Caesar William Sunseri Ⓢ Steubenville, Ohio; Jefferson Medical College of Philadelphia, 1919; aged 44; died, August 15.

John Samuel Agar, Chatham, Ont., Canada; University of Toronto Faculty of Medicine, 1890; aged 76; died, August 14.

Victor Jacques Jacobsohn, New York; Long Island College Hospital, Brooklyn, 1916; aged 48; died, August 27.

Benjamin Allen Mardis, San Francisco; Cooper Medical College, San Francisco, 1892; aged 70; died, September 3.

Milton Alexander Chaiken, Chicago; Chicago College of Medicine and Surgery, 1914; aged 52; died in September.

John A. Boatman, Middleton, Tenn. (licensed in Tennessee in 1915); at one time mayor; aged 79; died, August 14.

Ira L. Hill Ⓢ New York; Detroit College of Medicine, 1899; aged 64; died, September 2, at Scarsdale, N. Y.

Lewis Abner Law Ⓢ Alberta, Va.; Medical College of Virginia, Richmond, 1926; aged 44; died, August 13.

Amelia Mollie Fendler, New York; Woman's Medical College of Baltimore, 1892; aged 70; died, August 4.

Lee B. Epperson, Gurdon, Ark. (licensed in Arkansas in 1903); aged 64; died, August 29, of angina pectoris.

Walter Bernard Schwuchow Ⓢ Los Angeles; Rush Medical College, Chicago, 1903; aged 62; died, September 3.

Bernard Charles Marantz, New York; Maryland Medical College, Baltimore, 1912; aged 50; died, August 16.

Andrew O'Neill Ⓢ Uniontown, Pa.; Maryland Medical College, Baltimore, 1904; aged 68; died, August 2.

Benton H. Jones, Harriman, Tenn.; Knoxville (Tenn.) Medical College, 1909; aged 56; died, August 18.

Frances J. Weiser, New York; Long Island College Hospital, Brooklyn, 1924; aged 51; died, August 9.

James P. Rogers, Seymour, Tenn. (licensed in Tennessee in 1912); aged 69; died, September 3.

Joseph D. Ely, Fayette, Ohio; Detroit Medical College, 1884; aged 84; died, August 29.

Marion Hall Lewis, Boston; Boston University School of Medicine, 1895; died, August 1.

Bureau of Investigation

THE VOGUE SPECTACLE COMPANY FRAUD

Chicago Eyesight Swindle Barred from the Mails

Among the cruellest of frauds are those which trifle with the precious organs of sight. Some of these, whether involved in Post Office fraud orders or otherwise, have previously been dealt with in this department of *THE JOURNAL*. Among them have been "eyesight normalizers," courses in "eye exercises" and simple spectacles-by-mail schemes.

The Vogue Spectacle Company of Chicago was the brain child of one Irving Silvers, who, according to the memorandum on the Post Office investigation, advertised under this trade style the correction of eyesight deficiencies. The alleged simplicity of ordering glasses from him by mail and the pretended benefits to be gained by taking up his "bargain" offer were played up in this specimen advertisement quoted in the memorandum:

FIT YOUR OWN EYEGLASSES FREE

14 TRIAL LENSES FREE!	(Cut of eye-glasses)	SAVE MORE THAN HALF	(Cut of woman wearing glasses)
It's easy to fit your own eyeglasses by our simple		Get the 14 trial lenses FREE. Write today.	

improved method. Save More Than Half. Read small print—do close work—see far and near without eyestrain. We send you complete eye testers FREE.

SEND NO MONEY • 10 DAYS' TRIAL

WEAR VOGUE EYEGLASSES for 10 days. Get more comfort—look distinctive and smart in appearance. Latest styles priced only \$3.85 and up. Others as low as \$1.98. We guarantee satisfaction or refund money promptly. Broken lenses or frames repaired or replaced at low prices. We will send you FREE 14 trial lenses and illustrations of beautiful distinctive patterns for your selection. We only handle High Grade Single and Double Vision Toric Kryptoc Bifocal Lenses ground into one solid piece of glass.

VOGUE SPECTACLE CO., 3234 Lawrence Ave., DEPT. K90, CHICAGO, ILL."

As the memorandum showed, those who answered received a form letter, printed circular matter, so-called testing charts and two cardboard strips each containing seven pieces of glass to be used by the recipient in testing his eyes in order to determine the particular kind of spectacles needed to correct his vision. The literature, judging from the memorandum's quotations, was the expected claptrap of claims and testimonials and may be passed over without further comment here. The charts for testing the vision consisted of a printed cardboard for close reading and a printed sheet for distance. Also there were elaborate "Directions for Using Eye Tester" by means of two cardboard strip testers, about 9 inches long and 1½ inches wide. As mentioned before, each "tester" contained seven lenses and, of the total fourteen, eleven were plus lenses and three were minus ones.

The foregoing facts were brought out in the memorandum on the case, submitted by Hon. Calvin W. Hassell, Acting Solicitor for the Post Office Department. His report went on to show that two sets of the so-called tester lenses sent out by the Vogue concern to prospective purchasers of spectacles were submitted to the United States National Bureau of Standards for examination and measurement. The expert who measured them is said to have reported that his tests showed that in some instances the lenses were not of the dioptric strength claimed by the promoter, Silvers, or of a uniform strength such as would enable Silvers to determine from the report of the customer's self examination what strength of lens was required. Further, the testimony is said to have shown that a number of the lenses contained in each of the strip testers measured by the Bureau of Standards were so badly centered that their dioptric power could not be measured, and that persons using such devices could not correctly determine or report to the Vogue outfit their selection of lenses according to the instructions. The memorandum showed that twelve persons ranging in age from 24 to 61 years testified as to their self measurement of vision by the "Vogue" system and

that all but one or two were unable clearly or comfortably to read the letters on the "Vogue" distance chart at 10 feet while wearing the glasses that the defendant had sold them under the representation that they would correct the purchasers' vision; most of the witnesses testified that the glasses were uncomfortable for close reading.

A special witness for the government at the hearing of this case was Dr. Hollis U. Maness, Passed Assistant Surgeon for the United States Public Health Service, for which agency he specializes in the refraction of eyes and the prescribing of spectacles. Dr. Maness, the memorandum pointed out, had examined the eyes of the witnesses for distance and reading without glasses and had made a similar test with these persons' own glasses, then a third one with the Vogue concern's glasses and a fourth with physicians' regular testing equipment, including the use of test lenses for ordinary hyperopic, myopic, presbyopic and errors of refraction, together with examinations for the detection and correction of astigmatism, as well as appropriate charts for use with these lenses. In most of these tests Dr. Maness employed a cycloplegic. In every instance, he testified, the glasses furnished by the Vogue Spectacle Company were unsuitable for correcting the vision of the users, even those who were able to read the "Vogue" charts, for the continued use of the spectacles would injure their eyesight. The witnesses who had tried these glasses were all found to be suffering from some degree of astigmatism and this condition, Dr. Maness testified, was not one for which they could examine their eyes by means of the test strips sent out by the defendant company. As 85 per cent of all persons with defective vision are, according to Dr. Maness, astigmatic, it is obvious that this percentage of eyesight sufferers is thus eliminated from the possibility of obtaining relief through the defendant's system.

These and many other salient points were brought out in the testimony of Dr. Maness. One such point was the fallacy of the defendant's claim that the glasses he furnished would relieve headaches caused by defective vision, whereas Dr. Maness showed that such headaches may be due to various eye disorders that cannot be determined by the eye testing methods employed in this scheme or corrected by the spectacles furnished on the basis of such tests. He further pointed out the falsity of the claim that persons unable to read all of the printed matter furnished for the so-called preliminary "quick easy test" need glasses. His testimony showed that the eyes may be involved in many conditions such as vitreous opacity, corneal leukoma or central choroiditis, which could not be corrected by use of lenses.

The medical testimony further demonstrated that, although the promoters of the scheme represented that a "10 days trial" would be sufficient time for the prospect to determine whether the eyeglasses furnished him properly fitted his eyes, this period was not, in fact, adequate for the purpose, since spectacles which might feel comfortable for a while and might apparently relieve symptoms of trouble could eventually prove unsuited to the eyes. The evidence showed that the promoter's claim that the customer "cannot lose" was false, since eye injuries which might follow the use of unsuitable glasses certainly must be considered a loss to the purchasers.

Although the defendant's counsel argued that there was conflict between the medical testimony furnished by the government's expert witness, Dr. Maness, and the affidavit supplied for the defendant company's evidence by Dr. Paul K. Anthony of Chicago, it was brought out that Dr. Anthony had admitted that the company in question could not "correctly fit" or furnish "a perfect fit" in glasses to all persons who apply therefor. As Dr. Anthony did not appear at the hearing and thus was not subject to cross examination, little weight was given to any of his "evidence." According to the records of the American Medical Association Dr. Paul Krvavica Anthony was graduated by Loyola University School of Medicine, Chicago, in 1936 and was licensed to practice in Illinois in the same year. He is shown as a member of his local medical society but not as a Fellow of the American Medical Association. It is on record that his name was Paul Anthony Krvavica until he had it changed to Paul Krvavica Anthony by a court order in October

1937. The Post Office memorandum described him as "an oculist in the employ of the respondent." The concern also was said to have engaged the services of an Andrew H. Gosstron, described as an optometrist.

Altogether there was so much evidence to support the solicitor's charge that the business was a scheme for obtaining money through the mails by means of false and fraudulent pretenses, representations and promises that the Post Office Department, on Oct. 30, 1939, issued the recommended fraud order against the Vogue Spectacle Co., Vogue Spectacle Company and its officers and agents as such.

Correspondence

DIABETES

To the Editor:—In your issue of September 21, Dr. Joslin and his associates have patiently repeated some of the decisive reasons against lax diabetic treatment. Immediately after the discovery of insulin came the first pseudoscientific suggestion of giving enough insulin to provide for metabolism of a requisite amount of food and then letting the patient eat freely without regard to glycosuria or hyperglycemia. I long ago gave up arguments over the persistent repetitions of this error, according to the advice in Proverbs 27:22. As so much of human life and disability are involved, perhaps Dr. Joslin's warning may be reinforced by two summarized case records:

1. A woman aged 55, first seen in 1925, had diabetes, obesity, goiter, hypertension, arteriosclerosis and myocardial degeneration. Diabetes was controlled by reduction of weight from 160 to 140 pounds (from 72.6 to 63.5 Kg.). After five years, onset of hyperthyroidism caused loss of weight to 110 pounds (50 Kg.) and required 20 units of insulin twice daily. Under medical treatment the thyroid intoxication subsided. The patient has consented to avoid fat but has continually transgressed her liberal carbohydrate allowances. Now, weighing 138 pounds (62.6 Kg.), she is only partly sugar free on 104 units of insulin daily. The principal loss of tolerance occurred not with the hyperthyroidism but progressively at other times. She continually complains of pains, weakness and nervous symptoms. She is seen infrequently and consents reluctantly to stricter treatment and increases of insulin because her symptoms are thus definitely relieved.

2. A woman aged 24, seen in 1922, 5 feet 5 inches (165 cm.) tall, had rather mild diabetes and was kept controlled at a weight of 94 pounds (42.6 Kg.) for nearly a year without insulin. She then preferred to gain to 115 pounds (52 Kg.) by taking 24 units of insulin a day. She subsequently gained to 130 pounds (59 Kg.) and required 50 units of insulin daily. Owing to fear of insulin reactions and immunity from diabetic symptoms she departed from the rule of sugar freedom which was maintained prior to insulin. She adopted for herself a plan of convenience which has been endorsed in some clinics, namely that she has glycosuria during the early part of every day. Now, weighing 129 pounds (58.5 Kg.) after years of a low-fat high-carbohydrate diet, she cannot be sugar free with 100 units of insulin daily. Her freedom from discomforts may be explained by her comparative youth, but she has become impressed by the loss of tolerance, so that she may submit to closer supervision.

One man gave me a history of continuous heavy glycosuria for thirty years without treatment or diet restrictions and without any perceptible departure from health, but his ideas were then changed by gangrene. It is thus evident that observations of a few years do not establish the safety of any procedure in a chronic disease. The longest observations in my experience, however, have confirmed the prevention of both

progressiveness and complications under strict control. Contrary to Dr. Tolstoi's recent statement, there has been no change whatever since 1914 in the orthodox ideal of restoring the diabetic as nearly as possible to normal. Abundant testimony from that time to the present establishes this method at least as safe and dependable.

It seems demonstrable that the harm from inadequate treatment is not limited to loss of tolerance. Also it would be wrong to interpret Dr. Joslin's criticism as applicable to only one individual or institution. In an address before the Reizelhausen Foundation in Pittsburgh (Feb. 2, 1940) I mentioned that among the large institutions to which the general medical profession looks for guidance there is a record of ignorance or disregard of proved facts, fads and guesswork announced as brilliant new discoveries and recklessly applied in therapy, exaggerations of the dangers of hypoglycemia, teachings of the necessity or desirability of high blood sugar especially among groups such as cardiac or elderly patients, and unproved claims that certain overbalanced diets will obviate the harmful effects of poorly controlled diabetes on the blood vessels or general system.

The recent confirmation of the undernutrition principle by Dr. Best is not accidental, because the original conclusions were based on scientific proof. Dr. Tolstoi's communication in *THE JOURNAL* of October 12 clearly illustrates how institutions which supposedly stand for science actually practice empiricism. But if an unproved method is to be substituted for a known safe one, to see how it will turn out in practice, it should at least be tried cautiously and within limitations. It is morally indefensible to make wholesale trials on human beings, risking the chance that in twenty years they may prove to have been disastrously mistaken. Also, on this very point of clinical experience, it is noticeable that Joslin's comprehensive long-time statistics have been allowed to stand alone, and the persons and institutions having the greatest material and means for supporting their therapeutic claims by comparable figures have for some reason refrained from doing so. Two statements seem warranted: First, the example of the largest institutions has encouraged laxity among physicians and indirectly among patients. Second, diabetic patients treated just sufficiently to keep them out of acute trouble for a few years constitute the reservoir from which are drawn the great mass of the complications which cause most diabetic deaths today.

I was the first to state that diabetes is not inherently progressive, and also to set up the ideal of normal blood sugar as an index of thorough control of the disease and relief of pancreatic overstrain. As late as 1936 I found myself assigned to a five minute discussion on a program (*Bull. New York Acad. Med.* 12:309, 1936) occupied by speakers from large institutions who unanimously rejected this standard. The adoption by Marks (*M. Clin. North America* 24:649 [May] 1940) of the precise principles and method which I have so long advocated seems to represent a reform in a place where it was as much needed as in the place mentioned by Dr. Joslin. Hyperglycemia must denote an insulin deficit, because it is absent in the normal individual on an identical diet. I have shown that after glycosuria is stopped the amount of extra insulin required to reduce a high blood sugar to normal may be as much as 20 units a day. An important service of modern medicine has been to devise tests for detecting slight deficiencies of vitamins or other food materials and likewise of all endocrine glands and to correct these deficiencies. The sole exception pertains to one of the most vital endocrine products, namely insulin, and it is amazing that there should have been such widespread advocacy of ignoring this manifest deficiency as harmless. Furthermore, it is no more difficult to

treat ordinary cases strictly and keep watch against hyperglycemia than it is to treat them inefficiently and keep watch against dangerous emergencies. Diabetic deaths can be greatly reduced by copying the code of surgeons, namely that both immediate and remote results should be demonstrated and that the practice is open to any physician qualified to produce results up to the accepted standard.

FREDERICK M. ALLEN, M.D., New York.

MYASTHENIA GRAVIS

To the Editor:—In the correspondence columns of *THE JOURNAL*, September 7, page 876, are communications from Drs. Henry R. Viets of Boston and Leo D. Freyberg of Granville, N. Y., commenting on the report of a case of myasthenia gravis which I made in *THE JOURNAL*, July 13, page 123. This gives me opportunity to clarify certain points, as well as to report further progress of the case. Unfortunately for the patient, but fortunately for me, he had a mild return of symptoms at an opportune time.

Concerning the use of quinine, I accept the criticisms of Drs. Viets and Freyberg; their comments may serve to emphasize its contraindications in this condition. The unpleasant effects noted after two days of therapy were nausea, vomiting and ringing in the ears.

Dr. Viets stated that the symptoms as given were consistent with the diagnosis but that it was not clearly indicated that the patient had the primary symptoms of myasthenia gravis, namely fatigue on muscular motion with recovery after rest. This was indicated in the following: "Paresis of the pharyngeal and laryngeal muscles produced a nasal, higher pitched voice, and talking was a decided effort, requiring frequent intervals of rest to avoid development of a whisper. . . . He was able to say but a few words at a time and then had to wait a few minutes before resuming." The weakness of the muscles, always associated with effort followed by recovery on rest, was an outstanding symptom.

On recurrence of his symptoms ten months later he was given 1 cc. of 1:2,000 prostigmine methylsulfate, and he stated that relief of muscle fatigue of the neck and shoulders was noticeable in about twenty-five minutes. The diagnosis of myasthenia gravis was in my opinion such an obvious one that tests such as the reaction of Jolly were not required. Furthermore, according to Wechsler (*Text Book of Neurology*, ed. 3, Philadelphia, W. B. Saunders Company, 1935, pp. 204-205), the reaction may occur in normal persons and is frequently absent in myasthenia gravis; so its value apparently is not great. The weakness of the muscles after the initial effort of contraction was apparent, as was the recovery with rest.

On Aug. 20, 1940, there was a mild return of symptoms. The blood chlorides at this time were 462 mg. of the total chlorides as sodium chloride per hundred cubic centimeters of blood and blood creatinine 2.2 mg. per hundred cubic centimeters of blood. It will be recalled that the patient is a physician and at my request he commented on the progress of his case:

The onset of symptoms was so insidious for from ten to fourteen days that the patient failed to realize the exacerbation of his disease of nearly ten months before. The main symptom was a sensation of heaviness of the head due to fatigue of the neck and shoulder girdle muscles. This was noted within a few minutes of sitting or standing and was relieved shortly after lying down. Prolonged effort merely accentuated the fatigue of the neck and shoulders to the point of an aching pain which required longer rest for relief. Climbing stairs induced a slight to moderate dyspnea. The patient also noted a desire to take naps and sleep longer hours, which he ordinarily never required or indulged in. In other words, at the time of reporting back to Dr. Moehlig his symptoms were not nearly so many or marked as with the initial attack. They were identical, however, as to the insidious onset in muscles supplied by

the cervical plexus, induction with minimal effort, immediate relief on rest, plus an afebrile course with no early gastrointestinal signs or symptoms.

It was decided to give the patient a daily dose of 10 mg. of desoxycorticosterone acetate subcutaneously. For the next week he noted a gradual daily increase in the foregoing symptoms, with beginning anorexia and a loss of faculty to perspire. General weakness increased and the patient voluntarily increased his desoxycorticosterone acetate dose to 10 mg. twice daily. This seemed to just about hold the disease stationary—without improvement. The patient observed, as previously, relief of the neck and shoulder fatigue in about two hours after the injections, and this would last for approximately six hours before he felt poorly again.

Needless to say, the patient was depressed by his recurrence and the prospect of being forced to stop working. He fully appreciated, however, the dramatic and complete prolonged relief of severe symptoms which had followed the previous implantation of desoxycorticosterone acetate. Reading everything procurable on the disease, the physician-patient could easily and early place his syndrome as being that of a typical classic myasthenia gravis. In addition, perusal of the irregular and transitory results of other types of therapy further convinced him of the clinical excellence of desoxycorticosterone acetate implants.

The patient was further encouraged by the following practical observations: The implantation had been performed by placing two unbroken and one inadvertently crushed pellets (totaling 450 mg.) into an abdominal skin and subcutaneous incision. For several months this presented a broad, thin, slightly reddened and elevated, tender scar, typical of an underlying foreign body reaction. In retrospect, the sudden dramatic and continued rapid improvement six days after operation presumably was due to the crushed powdered tablet. The two remaining pellets began to be palpable after a few months. The patient commented that these were becoming more superficial and more easily palpable as time went on, and he thought they were going to extrude themselves gradually. Beginning two months ago, however, the skin scar gradually became white, retracted and insensitive, instead of red, elevated and tender. After a few more weeks recurrence of symptoms began to develop. Obviously all this points strongly to a scar tissue reaction about the pellets, delaying and decreasing absorption of the active substance.

On August 27, ten months since the implantation (Oct. 28, 1939), the scar and subcutaneous tissue containing the pellets was excised. On section two pellets were found; the third which had been broken was completely absorbed. The pellets were about one third their original size and each firmly and completely encapsulated within a cicatrix. The pellets weighed approximately 50 mg. each and since they originally weighed 150 mg., each gave up a total of 100 mg. In the period of 300 days the daily absorption rate was approximately 0.3 mg. per pellet. This corresponds with the observations of Thorn and his associates (Thorn, George; Howard, R. P.; Emerson, Kendall, Jr., and Firor, W. M.: *Treatment of Addison's Disease with Pellets of Crystalline Adrenal Cortical Hormone [Synthetic Desoxycorticosterone Acetate] Implanted Subcutaneously*, *Bull. Johns Hopkins Hosp.* 64:339-366 [May] 1939) of an absorption rate of from 0.25 to 0.3 mg. a day. The two pellets plus two additional ones of 150 mg. each (total 400 mg.) were implanted subcutaneously into the abdominal wall.

The laboratory report on the excised tissue was as follows:

Tissue consists of skin and subcutaneous tissue which included two areas of scar tissue. Microscopic diagnosis: Subcutaneous scar tissue. There is an area of low grade inflammation apparently encapsulating the foreign body.—Plinn F. Morse, M.D.

It has now been fourteen days since the patient was operated on. He continued to take 20 mg. of the desoxycorticosterone acetate daily for three days, then voluntarily reduced this to 10 mg. daily for one week, and for the past four days he has had no injections. He states that he is definitely improved, the improvement being particularly noticeable in the past few days. He has been able to carry on his work in the operating room and in practice with but slight distress and no need of rest periods for the past week.

Time will show whether these improvements were due to the long arm of coincidence or to the therapy. I appreciate the criticisms of Drs. Viet and Freyberg and will conclude with the final paragraph of my paper: "Naturally, further experiences with other patients as well as the continued progress of this patient is desirable before final conclusions concerning lasting benefits are made."

ROBERT C. MOEHLIG, M.D., Detroit.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

CAUSES OF HYPOGLYCEMIA

To the Editor:—A married woman aged 27 has complained for the past two years of blurring of vision, dizzy spells, hunger, sense of anxiety and nervous irritability, sometimes accompanied by nausea prior to her meals. From twenty minutes to one hour after eating she complains of exhaustion, sleepiness, sometimes accompanied by heart palpitation, nausea and vomiting. On occasion she complains of one sided headaches always accompanied by nausea and vomiting and unexplained periods of nausea and vomiting and urinary frequency and urgency lasting for from a few hours to the entire day. She has had a dull aching pain in the left upper quadrant, not constant in character, radiating through to the back and up to the scapula for the past seven years. The patient gives a history of hay fever of seven years' duration with moderate relief with treatment. Physical examination is essentially negative except for transient cardiac arrhythmia with rapid thready pulse on one or two occasions following mental shock. She had no childhood diseases except diphtheria. When an adult, tonsillectomy was performed after a short period of rheumatic arthritis. The patient's blood pressure and temperature are normal. She has maintained her weight throughout this period and feels exceptionally well between these abnormal periods. Examination of the eyes was negative. The urine was normal and the Wassermann reaction negative. The blood count was normal. The chest x-ray examination gave normal results. The basal metabolism was -5 . The electrocardiogram was negative, taken one year prior to the cardiac arrhythmia. Gallbladder x-ray examination was negative. Gastrointestinal x-ray films were negative except for chronic appendicitis. The dextrose tolerance test was as follows:

	100 Gm. of Dextrose		25 Gm. of Dextrose
Before meals	80.6	85	95.2
One hour after.....	64.3	49.1	59.7
Two hours after.....	Not taken	99	78.1
Three hours after.....	70.7	99	88.9

Do you believe that this case of hyperinsulinism is due to neurosis, allergic phenomena, neoplasm of the pancreas or simple dysfunction? What suggestion can you offer as to diagnosis and treatment?

M.D., New York.

ANSWER:—It must be remembered that not all cases of hypoglycemia are due to hyperinsulinism. The differential diagnosis of hypoglycemia is fraught with difficulty. Apart from the pancreatic causes one must consider pituitary disease, adrenal disease and extensive liver disease in which there is failure to store glycogen. None of these seem to fit well into this picture but they should be carefully ruled out. Mild hypoglycemia also accompanies autonomic imbalance (vagotonia).

The case described shows numerous departures from the usual pattern. One of these departures is the dextrose tolerance curve. The typical "hyperinsulinism" curve usually starts from a fasting level of 60 mg. or less per hundred cubic centimeters. It rises during the first hour and then falls below the fasting level. The curve shown by this patient is known as a "reverse tolerance curve." That is to say, the curve falls immediately after the ingestion of dextrose and later returns to or near the fasting level. Less, if possible, is known about such a reaction than is known about "spontaneous hypoglycemia." Another departure from the usual pattern is the failure of food to relieve the symptoms. As a matter of fact, the ingestion of food seems to accentuate the symptoms. It would be helpful to know the blood sugar level in this patient during an attack. The effect of epinephrine in overcoming attacks should also be investigated.

If liver damage, pituitary disease and adrenal disease can all be eliminated in this case, one must still differentiate between pancreatic hypoglycemia and that due to neurogenic causes, and this is extremely difficult. Because of the atypical circumstances pointed out, the weight of evidence seems to favor a neurogenic cause. The hypothesis has been advanced that these neurogenic cases are due to an overreaction of the pancreas to the stimulation of dextrose. On this basis it has been suggested that frequent feedings low in carbohydrate and relatively high in protein would tend to lower this stimulation.

As a rule the diagnosis of pancreatic neoplasm cannot be confirmed except by exploratory operation. This would not seem justified in the present case until all other efforts had failed to solve the problem.

ACTION OF "STAINING" ANTISEPTICS

To the Editor:—Is there any difference in antiseptic value between two solutions of proved equal potency in vitro if one stains the tissues with which it comes in contact and the other does not? Does the staining substance enter into chemical combination with the tissue proteins? If it does, is there any greater danger of sensitization with the use of such a substance? Is a nonstaining solution absorbed to as great an extent as is a staining solution?

Seymour Schuback, M.D., New York.

ANSWER:—There are many sorts of stains used in the preparation of antiseptic solutions. Some of them have of themselves germicidal action but others have virtually none. They usually are added by manufacturers in order to delimit more clearly the area of skin being treated rather than to increase the bacteriostatic or bactericidal effect. It certainly cannot be assumed that addition of a stain necessarily increases the disinfectant power of any antiseptic solution.

Effective disinfection of tissues is primarily a problem (1) of employment of a potent agent and (2) of adequate contact between bactericide and bacteria. In standard in vitro tests, optimal and uniform conditions for such contact may obtain. But on skin and mucous membranes and in wounds contact with the bacteria present is an uncertain matter. Staining of tissues by no means assures that the solution has made contact with all the micro-organisms harbored there. Another factor, too often overlooked, is the degree to which tissues or their secretions combine with the chemical disinfectant so as to lessen its germicidal action. Thus on theoretical grounds, under certain conditions, it is conceivable that of "two solutions of proved equal potency in vitro" the one which stains the tissues might at the same time be "fixed" or otherwise neutralized in part by them, so as to become actually less effective as a disinfectant than the other solution.

Chemical "combinations" of stains with live tissues is a complex matter as yet incompletely understood. They involve "reactions" between substances whose chemical structures often are not fully known. Even more obscure is the chemistry of "sensitization." The answer to the question of whether there is greater danger of sensitization with the use of antiseptics which stain must be sought rather in the clinical experience of the profession. So far as known, no evidence has been accumulated to show that any degree of sensitization is attributable to staining properties of germicidal solutions. Untoward reactions are probably more often due to the chemical germicide itself, whether it discolors the tissues or not, rather than to any stain that may have been added to it. And it is doubtful whether staining of tissues is a dependable index of "chemical combination with the tissue proteins," absorption of the antiseptic or "danger of sensitization."

VITAMIN B₁ IN CARDIOVASCULAR AND GASTRO-INTESTINAL DISORDERS

To the Editor:—Has any clinical work been done to evaluate the use of vitamin B₁ in improving heart conditions, and vitamin B complex in functional stomach disorders? What is the value of these products in these specific conditions?

Irwin I. Lubowe, M.D., New York.

ANSWER:—Clinical studies of the effect of vitamin B₁ on cardiovascular disturbances in specific thiamine deficiency have been reported by Weiss and Wilkins, Jolliffe and Goodhart, Strauss and others. There is considerable evidence which indicates that the various members of the vitamin B complex have a definite function in gastrointestinal motility, and it is probable that a lack of either nicotinic acid or thiamine hydrochloride, or other unknown factors, is important in the development of certain functional digestive disorders. The literature concerning the relationship of the vitamin B complex to gastrointestinal malfunction has been reviewed by Chesley, Dunbar and Crandall and by Borsook and his co-workers.

References:

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- Strauss, M. B.: Therapeutic Use of Vitamin B₁ in Polyneuritis and Cardiovascular Conditions: Clinical Indications, *The Journal*, March 26, 1938, p. 953.
- Chesley, E. F.; Dunbar, Jean, and Crandall, L. A.: The Vitamin B Complex and Its Constituents in Functional Digestive Disturbances, *Am. J. Digest. Dis.* 7: 24 (Jan.) 1940.
- Borsook, Henry; Dougherty, Paul; Gould, A. A., and Kremers, E. D.: The Vitamin B Complex and Functional Chronic Gastrointestinal Malfunction: A Study of 227 Cases, *Am. J. Digest. Dis.* 5: 246 (June) 1938.

HEMOGLOBIN ESTIMATIONS

To the Editor:—What is the most generally accepted normal figure for hemoglobin in the blood? Some systems figure 13.8 Gm. per hundred cubic centimeters of blood, others 14.5, some 16 and 17. This is confusing, especially since many physicians speak of it in terms of percentage and not in grams. J. Street Brewer, M.D., Roseboro, N. C.

ANSWER:—In making hemoglobin estimations the most important point is to determine the mean number of grams per hundred cubic centimeters on the basis of 5,000,000 red cells. Several such studies have been made in this country. Osgood found 14.29 Gm., Wintrobe 14.25 Gm. and Haden 15.38 Gm. It is possible that the amount varies in different sections of the United States. Since laboratory workers are not agreed on one figure for the normal amount of hemoglobin per hundred cubic centimeters of blood with a count of 5,000,000 red cells it is best to estimate the amount to be used for each laboratory. The standard is easily determined by estimating the hemoglobin in grams and counting the red cells in at least ten normal adults. The following example illustrates such a calculation:

Number	Red Cell Count per Cubic Millimeter (Millions)	Hemoglobin per 100 Cc. of Blood (Grams)
1	5.02	15.5
2	4.00	12.6
3	4.65	14.9
4	5.50	16.8
5	4.78	15.0
6	4.57	14.2
7	4.25	13.5
8	5.31	16.5
9	5.80	16.9
10	4.92	15.1
Mean	4.88	15.1

The hemoglobin in grams per hundred cubic centimeters of blood calculated for a count of 5,000,000 red cells is $\frac{5.00 \times 15.1}{4.88} = 15.4$ Gm.

This figure will give a color index within normal limits in normal persons for the laboratory in which it is determined.

DOES CORAL GROW IN HUMAN TISSUE?

To the Editor:—The beaches in the vicinity of Honolulu are filled with coral mixed with sand. This coral is thrown up by the waves, and naturally a considerable amount gets into the ears of bathers. Most persons do not notice the presence of the coral in the ears for periods ranging from one week to several weeks and the first complaint is pain in the ear and a whitish discharge. When the ear is examined, small coral growths are noted. The canal itself is not particularly inflamed but is swollen and macerated. I have seen growths of coral formation about the size of half a dime (5 mm.) and branching in coral formation along the canal. It is my impression that this coral grows in the canal, for after apparent cure from treatments given the condition recurs without the patient having been in bathing again. I have found that the milder forms of treatment such as warm boric acid irrigations followed by phenol and glycerin are of more benefit than the more aggressive treatments. In this connection also I have heard of several cases on the islands of coral growing in the tissues of persons who have had coral lacerations and abrasions after the wounds have apparently healed. I can find nothing in the standard books on this subject but am informed that this does occur and that, if the coral gets into the bony structure, quite a serious condition results. Can you give me any information regarding such a possibility? I have also been informed on numerous occasions that one should never use tincture of iodine on coral inflicted wounds. The reason is given that the animal life producing the skeletal coral grow or feed on the iodine content of the sea water and therefore iodine enhances the growth of the animal rather than inhibits it. Is there any truth in this assertion and if so what would be the accepted form of treatment of coral wounds? M.D., Pearl Harbor, T. H.

This inquiry was referred to Dr. Nils P. Larsen, medical director of the Queen's Hospital, Honolulu, who replied as follows:

ANSWER:—This old Hawaiian superstition is believed by certain natives and is often repeated but it lacks foundation in fact. In my eighteen years at the Queen's Hospital we have performed more than 300 autopsies a year but have failed to see anything of this nature. As a hobby I have taken up diving and underwater photography and have been down on the coral beds in every part of this island and three other islands. I don't believe there is a variety of coral that grows in Hawaiian waters on which I have not been cut and scratched. In one accident I fell into one of the big coral trees in Kaneohe Bay and had cuts the entire length of my body from my ankles to my forehead. In that particular bay every coral cut raises a deep red welt. This condition, however, clears in twenty-four hours. Considering the extreme differences of metabolism, growth and type of animal between coral and man, the statements recall that of the young botanist who thought dandelions could be grafted on apple trees.

The reason for the old Hawaiian superstition about coral growing in a patient I believe comes from the natives seeing sequestrums come from cases of osteomyelitis. Since nearly all patients here with osteomyelitis usually get their cuts in connection with the sea, and since in every part of the sea there is coral, when they saw an irregular piece of bone escape from a wound and the leg was greatly swollen it would be easy to think that it was actually coral growing in the wound.

RECURRENT CANCER OR SURGICAL ELEPHANTIASIS

To the Editor:—A woman eight years ago had a radical operation for cancer of both breasts. About six weeks ago her right arm, shoulder and right side of the chest became swollen. Careful examination and roentgenograms showed no malignant growth and the diagnosis was lymphangiectasis. There has been no improvement during this period and the arm is uncomfortable at all times and especially when an attempt is made to use it. Even the hand becomes swollen and bluish. Can you suggest any treatment? M.D., California.

ANSWER:—The question arises as to whether the edema of the arm in the case described is due to recurrent disease along the axillary vein or whether the condition is an example of elephantiasis chirurgica. The negative clinical and x-ray observations constitute evidence against but do not totally exclude recurrent disease as a causative factor. If recurrent disease along the axillary vein is demonstrated or suspected, radiation therapy is indicated and offers some hope of relief. The treatment of elephantiasis chirurgica presents great difficulties and on the whole has been unsatisfactory. Handley recommends lymphangioplasty in certain cases. It has been suggested recently that small doses of x-rays over the arm have given improvement, but these observations have not yet been confirmed. Application of heat gives only occasional and temporary relief. Elevation of the arm is helpful.

MECHANICAL AND MALARIAL FEVER THERAPY
IN SYPHILIS

To the Editor:—Do the diathermy heat treatments give better results than malaria fever treatments in cases in which the spinal Wassermann reaction is positive? Is it advisable to use fever treatments in cases in which the spinal Wassermann reaction is negative but the blood Wassermann reaction remains positive despite antisyphilitic treatment?

Arthur Leistyna, M.D., Ilion, N. Y.

ANSWER:—A recent survey by a subcommittee of the Cooperative Clinical Group of the value of fever therapy administered by malaria and by mechanical means will appear in print shortly. The study showed that the results from the machine therapy and from malaria were practically the same in a group of patients with dementia paralytica. Each method of treatment has certain advantages over the other, which, however, tend to offset each other so that the final results are much the same.

The use of fever therapy is indicated for patients with neurosyphilis who present clinical signs of nervous system involvement or who have a positive spinal fluid test. The patient with clinical neurosyphilis, when the signs are suggestive of dementia paralytica or when the results of chemotherapy are not satisfactory, should be given the advantage of fever therapy immediately. If the patient has no clinical signs of neurosyphilis but has a positive spinal fluid test (especially if it has parietic characteristics) a course of fever therapy may be given when two sources of chemotherapy have failed to improve the spinal fluid reaction. Fever therapy is not indicated for patients who have latent syphilis with a persistently positive Wassermann or flocculation reaction of the blood.

EOSINOPHILIA WITH GASTROINTESTINAL SYMPTOMS

To the Editor:—The answer to the question "Eosinophilia with Gastrointestinal Symptoms" (The Journal, September 21, p. 1041) reasonably suggests the possibility of an allergic etiology. The existence of an allergic mechanism—probably of food sensitivity—is quite likely in this particular instance. I have studied a number of allergic children with gastrointestinal symptoms due to food allergy (Roentgen Studies of Children with Alimentary Disturbances Due to Food Allergy, *Am. J. Dis. Child.* 5:4:1239 [Dec.] 1937). Gastric retention of varying degrees in association with pylorospasm were characteristic. These observations parallel those of the inquirer in the query in question. The recurrent (periodic) nature of the patient's attacks, consisting of abdominal pain and protracted vomiting, again suggest a possible food sensitivity. Dr. Kenneth G. Jennings and I are publishing observations made on a group of children suffering from recurrent attacks of vomiting abdominal pain which would seem to be similar to the attacks of this patient (Recurrent Vomiting in Children: The Factor of Food Hypersensitivity, *J. Pediatr.*, to be published). A more careful inquiry into the patient's diet with particular emphasis on possible food sensitivities might be revealing.

Joseph H. Fries, M.D., Brooklyn.

Medical Examinations and Licensure

COMING EXAMINATIONS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, October 19, page 1394.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 17-19. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ARKANSAS: * *Regular*. Little Rock, Nov. 7-8. Sec., Dr. D. L. Owens, Harrison. *Eclectic*. Little Rock, Nov. 7. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), Los Angeles, Dec. 11. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

CONNECTICUT: * *Written*. Hartford, Nov. 12-13. *Endorsement*. Hartford, Nov. 26. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. *Homeopathic*. Derby, Nov. 12-13. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: July 8-10. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: * Washington, Nov. 11-12. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: * Tampa, Nov. 18-19. Sec., Dr. W. M. Rowlett, Box 786, Tampa.

HAWAII: Honolulu, Jan. 8-11. Sec., Dr. James A. Morgan, 48 Young Building, Honolulu.

INDIANA: Indianapolis, June 17-19. Sec., Board of Medical Registration and Examination, Dr. J. W. Bowers, Citizens Trust Bldg., Fort Wayne.

IOWA: Des Moines, Dec. 9-11. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

KANSAS: Topeka, Dec. 10-11. Sec., Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, Dec. 3-5. Sec., State Board of Health, Dr. A. T. McCormack, 620 Third St., Louisville.

MAINE: Portland, Nov. 12-13. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Regular*. Baltimore, Dec. 10-13. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic*. Baltimore, Dec. 10-11. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 12-14. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MISSISSIPPI: *Reciprocity*. Jackson, December. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MISSOURI: Kansas City, Oct. 29-31. Sec., State Board of Health, Dr. Harry F. Parker, State Capitol Bldg., Jefferson City.

MONTANA: *Reciprocity*. Helena, March 31. *Written*. Helena, April 1. Sec., Dr. S. A. Cooney, 216 Power Block, Helena.

NEBRASKA: * Lincoln, Nov. 7-9. Dir., Bureau of Examining Boards, Mrs. Clark Perkins, 1009 State Capitol Bldg., Lincoln.

NEVADA: *Reciprocity* with oral examination, Nov. 4. Sec., Dr. Fred M. Anderson, 215 N. Carson St., Carson City.

NEW HAMPSHIRE: Concord, March 13-14. Sec., Board of Registration in Medicine, Dr. T. P. Burroughs, State House, Concord.

NEW YORK: Albany, Buffalo, New York and Syracuse, Jan. 27-30. Chief, Bureau of Professional Examinations, Mr. Herbert J. Hamilton, State Education Department, 315 Education Bldg., Albany.

NORTH CAROLINA: *Reciprocity*. Durham, Dec. 10. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, Jan. 7-10. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: Columbus, Dec. 9-12. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OKLAHOMA: * Oklahoma City, Dec. 11. Sec., Dr. James D. Osborn Jr., Frederick.

OREGON: * *Reciprocity*. Portland, October. *Written*. Portland, Jan. 14-16. Exec. Sec., Miss Lorraine M. Conlee, 608 Failing Bldg., Portland.

PENNSYLVANIA: Philadelphia, January. Acting Sec., Bureau of Professional Licensing, Miss Marguerite G. Steiner, 358 Education Bldg., Harrisburg.

SOUTH CAROLINA: Columbia, Nov. 12. Sec., Dr. A. Earle Booser, 505 Saluda Ave., Columbia.

SOUTH DAKOTA: * Pierre, Jan. 21-22. Dir., Medical Licensure, Dr. J. F. D. Cook, Pierre.

TEXAS: Austin, Nov. 25-27. Sec., Dr. T. J. Crowe, 918-920 Mercantile Bldg., Dallas.

VERMONT: Burlington, Feb. 11. Sec., Dr. W. Scott Nay, Underhill.

VIRGINIA: Richmond, Dec. 4-6. Sec., Dr. J. W. Preston, 30½ Franklin Rd., Roanoke.

WEST VIRGINIA: Morgantown, Oct. 31-Nov. 2. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WISCONSIN: * Madison, Jan. 14-17. Sec., Dr. H. W. Shutter, 425 E. Wisconsin Ave., Milwaukee.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

MICHIGAN: Ann Arbor, Detroit and East Lansing, Feb. 14-15. Sec., Miss Flora E. Dube, East Lansing.

OKLAHOMA: Oklahoma City, Nov. 18. Sec. of State, Hon. C. C. Childress, State Capitol, Oklahoma City.

RHODE ISLAND: Providence, Nov. 20. Acting Chief, Division of Examiners, Mr. E. Clyde Thomas, 366 State Office Bldg., Providence.

SOUTH DAKOTA: *Examination*. Yankton, Dec. 6-7. *Endorsement*. Dec. 21. Sec., Dr. Gregg M. Evans, Yankton.

WISCONSIN: Milwaukee, Dec. 7. Sec., Prof. Robert N. Bauer, 3414 W. Wisconsin Ave., Milwaukee.

Arizona July Report

Dr. J. H. Patterson, secretary, Arizona State Board of Medical Examiners, reports the written examination for medical licensure held at Phoenix, July 2-3, 1940. The examination covered ten subjects and included 100 questions. An average of 75 per cent was required to pass. Four candidates were examined, three of whom passed and one failed. The following schools were represented:

School	PASSED	Year Grad.	Number Passed
Tulane University of Louisiana School of Medicine.....	(1936)		1
University of Nebraska College of Medicine.....	(1939)		1
University of Tennessee College of Medicine.....	(1939)		1
School	FAILED	Year Grad.	Number Failed
St. Louis University School of Medicine.....	(1938)		1

Ohio June Report

Dr. H. M. Platter, secretary, Ohio State Medical Board, reports the oral, practical and written examination for medical licensure held at Columbus, June 3-6, 1940. The examination covered eleven subjects and included eighty questions. An average of 75 per cent was required to pass. Two hundred and sixty candidates were examined, 253 of whom passed and seven failed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
University of California Medical School.....	(1940)		81.8
George Washington University School of Medicine.....	(1939)		82.2
Loyola University School of Medicine.....	(1940, 2)*	(1940)	82.1
Northwestern University Medical School.....	(1940)		82.3
Rush Medical College.....	(1939)		86.3
University of	(1938)		84.1
Johns Hopkins	(1924)		83
Harvard Medical School.....	(1935) 85.7, (1936) 85.8, (1938) 84.6, (1940) 85.1		85.5
University of Michigan Medical School.....	(1939)		80.7
Washington University School of Medicine.....	(1938)		85.1
Creighton University School of Medicine.....	(1939)		80.8
81.1, 82.4			
Cornell University Medical College.....	(1937) 86.6, (1938) 86.6		83.1
New York University College of Medicine.....	(1939)		82.6
University of Rochester School of Medicine and Dentistry	(1939)		83.3
Ohio State University	(1939)		80.5
(1940) 76.7, 77, 80.5, 80.7, 80.8, 80.8, 81, 81.4, 81.5, 82, 82, 82, 82, 82.1, 82.2, 82.2, 82.3, 82.3, 82.3, 82.6, 82.7, 82.8, 82.8, 83, 83, 83, 83.2, 83.3, 83.4, 83.4, 83.5, 83.5, 83.6, 83.7, 83.7, 83.7, 83.8, 84, 84, 84.2, 84.3, 84.5, 84.5, 84.5, 84.6, 84.6, 84.7, 84.7, 84.7, 84.7, 84.8, 85, 85.1, 85.1, 85.3, 85.4, 85.5, 85.5, 85.7, 85.8, 85.8, 86.1, 86.1, 87, 87.2, 87.5, 88.3, 88.4			75
University of Cincinnati College of Medicine.....	(1940)†		76.6
75.1, 76.5, 76.6, 77.1, 78.1, 78.6, 79, 79, 79.2, 79.3, 80, 80, 80.1, 80.1, 80.2, 80.5, 80.5, 80.5, 80.6, 80.6, 80.6, 80.6, 80.7, 80.8, 80.8, 81.1, 81.1, 81.1, 81.2, 81.4, 81.5, 81.5, 81.5, 81.5, 81.5, 81.7, 81.8, 82.1, 82.3, 82.3, 82.3, 82.3, 82.4, 82.4, 82.5, 82.5, 82.8, 82.8, 83, 83, 83, 83.3, 83.4, 83.5, 84, 84.1, 84.1, 84.2, 84.3, 84.3, 84.4, 84.5, 84.5, 84.6, 84.6, 84.6, 85, 85.4, 85.7, 85.7, 86.3, 86.6, 87, 87.8			
Western Reserve University School of Medicine.....	(1940)		76.6
78.1, 78.4, 78.4, 78.5, 78.7, 79.2, 79.8, 80.6, 80.8, 80.8, 81, 81.2, 81.2, 81.5, 81.8, 82, 82.3, 82.4, 82.5, 82.6, 82.6, 82.7, 83.1, 83.2, 83.3, 83.4, 83.5, 83.7, 83.7, 83.7, 83.8, 83.8, 84.1, 84.3, 84.5, 84.5, 84.5, 84.6, 84.6, 84.8, 84.8, 85.1, 85.1, 85.2, 85.3, 85.5, 85.5, 85.6, 85.7, 85.8, 86.3, 86.7, 87.3, 87.4, 87.5, 88			
Jefferson Medical College of Philadelphia.....	(1939)		81
(1940) 83.3, 84, 86.4			
University of Pennsylvania School of Medicine.....	(1940)		79.7
University of Pittsburgh School of Medicine.....	(1937)		84.3
University of Wisconsin Medical School.....	(1939)		84
University of Toronto Faculty of Medicine.....	(1939)		81.6
McGill University Faculty of Medicine.....	(1931)		84.8
Medizinische Fakultät der Universität Wien.....	(1908)		76.8
(1913) 82.1, (1917) 76.5, 81.5, (1922) 76.4, (1920) 80.1, (1927) 82.4			
Deutsche Universität Medizinische Fakultät, Prag.....	(1911)		80.6
Université de Montpellier Faculté de Médecine.....	(1933)		77.5
Rheinische Friedrich-Wilhelms-Universität Medizinische Fakultät, Bonn.....	(1919)		80.2
Magyar Királyi Ferenc József Tudományegyetem Orvostudományi Kara, Szeged.....	(1934)		79.4
School	FAILED	Year Grad.	Number Failed
Medizinische Fakultät der Universität Wien.....	(1908), (1916)		2
Albert-Ludwigs Universität Medizinische Fakultät, Freiburg	(1912)		1
Ludwig-Maximilians-Universität Medizinische Fakultät, München	(1914)		2
Universität Heidelberg Medizinische Fakultät.....	(1912), (1921)		
Regia Università degli Studi di Modena. Facoltà di Medicina e Chirurgia.....	(1934)		1

* These applicants have completed four years' medical work and will receive the M.D. degree on completion of internship. Licenses have not been issued.

† These applicants have received the M.B. degree and will receive the M.D. degree on completion of internship.

Book Notices

The Louse: An Account of the Lice Which Infest Man, Their Medical Importance and Control. By Patrick A. Buxton, M.A., M.R.C.S., L.R.C.P., Director, Department of Medical Entomology, London School of Hygiene and Tropical Medicine, London. Cloth. Price, \$3. Pp. 115, with 28 illustrations. Baltimore: William Wood & Company, 1940.

The existence of war conditions makes more important than previously complete information regarding the dissemination of lice of the body, the head and the pubis, and also of methods of prevention and control. The little book by Dr. Buxton is probably the most complete available and is certainly an authoritative contribution. It covers every aspect of the subject and in the appendix provides details of the technic to be used in research as well as a complete bibliography and a good index.

Cancer in Childhood and a Discussion of Certain Benign Tumors. Edited by Harold W. Dargeon, M.D., F.A.A.P., Attending Pediatrician, Memorial Hospital for Cancer and Allied Diseases, New York. Cloth. Price, \$3. Pp. 114, with 51 illustrations. St. Louis: C. V. Mosby Company, 1940.

This is a symposium on neoplastic diseases of children. It is a collection of papers which have been previously published almost entirely in the *Journal of Pediatrics* by various members of the staff of the Memorial Hospital and represents the experiences at this hospital for cancer and allied diseases. The book is introduced by two chapters which relate to the general aspect of childhood cancer and serve to unify an otherwise disjointed array of material. The first chapter is written by James Ewing and includes a review of those features of cancer peculiar to the young together with a concise survey of various related subjects. The chapters on the whole are brief and include, in addition to the first two, sections on tumors of bone, the leukemias and allied diseases, genito-urinary cancer, gynecologic cancer, cancer of the head and neck, and blood and lymph vessel tumors. Lack of balance, frequently encountered in symposiums, and cursory treatment of the subject matter is observed in some of the sections. For example, the chapter on bone tumors, which stresses the importance of x-ray examinations, contains no reproductions of roentgenograms although more than fifty illustrations are included in the book. The chapter on tumor of the soft somatic structures, however, deserves commendation for its careful arrangement and lucid presentation. Of special interest to the pediatrician will be the tables presenting mortality statistics of the U. S. Department of Commerce and of the Bureau of Records of New York City. These show definitely that cancer is one of the important diseases of children. Additional data contained in the book lend further emphasis to such a conclusion. Although the book cannot be considered a complete treatise on cancer in children, considerable valuable information is presented.

The Hypothalamus and Central Levels of Autonomic Function. Proceedings of the Association, December 20 and 21, 1939, New York. Editorial Board: John F. Fulton, M.D., Chairman, S. Walter Ranson, M.D., and Angus M. Franz, M.D. Research Publications, Association for Research in Nervous and Mental Disease, Volume XX. Cloth. Price, \$10. Pp. 980, with 319 illustrations. Baltimore: Williams & Wilkins Company, 1940.

In this volume are collected papers reported before the Association for Research in Nervous and Mental Disease. The subject of the hypothalamus is considered under the three headings anatomy, physiology and clinical. In the first part an anatomic atlas is included which should be invaluable for all workers in the field. The first and second portions are complete and summarize all that is really known on the subject. The third part is the weakest and cannot be compared favorably with the remainder of the book. A concise survey of the clinical syndromes cannot be obtained from this work and must be searched for elsewhere. The bibliography is extensive and satisfactory. There is an excellent index which makes the book an adequate tool for the investigator. The editorial board is to be congratulated for a brilliant collection of summarizing papers from which subsequent investigators may take off for further advances on the subject.

Traité de l'immunité dans les maladies infectieuses. Par le Dr Jules Bordet, Directeur de l'Institut Pasteur de Bruxelles. Second edition. Paper. Price, \$3.90. Pp. 879. Paris: Masson & Cie, 1939.

The first edition of this valuable textbook on immunity appeared about 1920. Besides being brought entirely down to date, the volume has acquired 160 additional pages. The reference publications cover both those of the Old and those of the New World, attesting the author's broad acquaintance with the literature. The introduction points out that life is maintained by an equilibrium continually menaced in which correlation of functions is rarely perfect but defects are corrected by various phenomena of adaptation. Immunity in its various aspects is analyzed and its importance in the progress of science pointed out.

The book is divided into four appropriate parts: The first considers generalities such as infection and the factors of virulence, taking up variously the nature and properties of microbial poisons, endotoxins, anatoxins, vegetable toxins, animal poisons and the mechanism of intoxication, followed by variations of virulence, variations, R and S inequalities, variabilities of metabolism and the origin of virulence; then the circumstances favoring infection; the penetration of microbes and extension of infection covering contagiousness, portal of entry, penetration of toxins, organotropy and cytotoxicity, incubation, latent microbialism and inapparent infections; included next are the causes of death, specific and nonspecific; then natural and acquired immunity are appropriately considered with age, species, heredity and individual chemical differences as well as the part played by inflammation and phagocytoses, the various phases of vaccination in the mechanism of acquired immunity, with the significance of passive and active immunity, detailed to the role of the placenta and milk. Allergy, anaphylaxis and hypersensitiveness are detailed under incomplete acquired immunity; finally, the first chapter considers protein therapy and pyretotherapy, with a chapter on the general significance of the phenomenon of immunity. Part 2 dwells on cellular immunity with phagocytoses and resorption; phagocytosis, inflammation, and immunity; the circulatory system and inflammation; the adjuvant factors such as opsonins and exudates are considered appropriately. Part 3 takes into consideration the humoral factors of immunity such as antitoxins and antiferments; the agglutinant, bacteriolytic, hemolytic, precipitant and cytotoxic factors are given full elucidation; antitryptic actions, lysozyme, autolysis, complement fixation, including the serodiagnosis of syphilis, flocculation reactions, haptens and artificial antigens as well as the chemical nature of antibodies are presented; in this part also are given the various theories on the mode of union of antibodies and antigens as well as their specificity; finally, blood groupings and their relations in man and animals are detailed. The fourth main division of the book deals with the exact parts played by immunity in specific diseases and immunity in malignant tumors; finally anaphylaxis and allergy are analyzed into their various phenomena—antianaphylaxis, anaphylatoxins, the role of anaphylaxis in pathology, the character of allergy, the hemorrhagic reactions (Sanarelli, Schwartzman), and finally the significance of allergy and immunity especially in tuberculosis closes this extensive work covering one of the most intricate phases of modern science.

In spite of the voluminous character of this valuable textbook, unfortunately it will suffer the shortcomings of any work in a field undergoing such rapid scientific advances as those occurring in the field of immunology. This will probably be the criticism offered by the investigator; but for a ready reference or a student's textbook in immunology it should fill an important place especially for the scientific and medical scholar able to read French fluently. Illustrations and tables are noteworthy for their absence, but in this field the lack is not felt as much as would be the case in other closely related fields of medicine.

The publisher has done a creditable job on a good grade of paper and at a modest price. The paper cover need be no drawback to those who handle their books carefully and who are primarily interested in the subject matter presented. The volume can be recommended to all interested in the broad subject of immunity in its various phases and not requiring technics and technical details.

Pneumokoktypernes forekomst i Danmark. Af Børge Vammen. [Occurrence of Pneumococcal Types in Denmark.] Denne Afhandling er af det lægevidenskabelige Fakultet antaget til offentlig at forsvares for den medicinske Doktorgrad, København, 1940. [With an English Summary.] Paper. Price, 8 Danish kroner. Pp. 104. Copenhagen: Ejnar Munksgaard, 1940.

Dr. Vammen has contributed, from Denmark, an excellent study on the type distribution in the pneumococcal pneumonias. The occurrence of various pneumococcus types as reported by investigators in Denmark, England and elsewhere and in America, where the intensive study of this subject originated, are compared in tables. The distribution of the types is similar in various places excepting for a strikingly greater incidence of type II in Denmark and England than in New York and Boston. There is an English translation of the excellent summary and numerous comprehensive tables, so that this book will be of value to workers unfamiliar with the Danish language. Vammen has added several additional new types to those of Cooper. They have been segregated from the x group or by more refined differentiation from some of the older types, notably IX and X. Vammen pleads for the establishment of a central international source for the preservation and distribution of pneumococcus strains and diagnostic serums. Under present conditions of world strife, this would be difficult. However, the William Hallock Park Laboratory of the New York City Department of Health has distributed cultures and typing serums since Georgia Cooper first described her types. The types are preserved by the American Type Culture Association; there will be unfortunate confusion if new numbers are assigned by each worker without consultation with some central responsible office. Vammen observes that "Repeated examinations of the nursing staff of a ward with many pneumonia patients showed that only 1.3 per cent had the same types as those found in the pneumonia patients of the ward. This low frequency, as compared with the frequency in family contacts, indicates that other circumstances than contact also play a part in the genesis of the carrier state." However, other circumstances need not be brought in until the closeness and continuity of contact and the use of utensils which occurs in family life are considered. This monograph is an exemplar of fine Scandinavian medicine and of the growing influence of American research. It appeared before the recent violation of Denmark and it is hoped that the western progress of Nazism will not spell the twilight of intellectual effort in the northern countries.

The Enamel of Human Teeth: An Inquiry into the Formation of Normal and Hypoplastic Enamel Matrix and Its Calcification. By Moses Diamond and Joseph P. Weinmann. From the Division of Oral Anatomy, School of Dental and Oral Surgery, Columbia University. Paper. Price, \$1.50. Pp. 105, with 52 illustrations. New York: Columbia University Press, 1940.

The authors reject the generally accepted hypothesis of Retzius that human tooth enamel is formed in layers from within outward and that the organic matrix of each layer is calcified progressively as developed. According to them the organic matrix is formed in layers much as claimed by Retzius, but it is impregnated as it is produced with mineral salts in a colloidal state. The consistency of this matrix is not as soft as that of cheese or soft enough to be cut with the finger nail as described by Ebner and Beust but much firmer. Although the amount of contained mineral salts may progressively increase as the matrix grows older, there is no calcification until the full thickness of the matrix is fully formed and the enamel organ has begun to atrophy and undergo reduction. Then and then only does the relatively firm matrix with its content of colloidal minerals change into the mature hard, stonelike enamel. The term calcification according to the authors should be limited strictly to this last change. Hypoplasia of tooth enamel, they believe, is due to disturbances in the production of enamel matrix and not to disturbances of calcification. Furthermore, hypoplasia is limited in its origin to the last four prenatal months and the first year after birth. The principal contention of the authors seems to be adequately supported by strong evidence from their own and other material. Confirmation of some of the details is dependent on further examination by other methods, chiefly chemical, than those used. Many of the conclusions with respect to hypoplasia are to be doubted because they are based on too

little evidence and because too little attention has been given to the effects of injuries on undifferentiated and fully differentiated cells and the consequent differences in the results. The type is unnecessarily large and the illustrations unduly generous in size; the printing, paper, cuts and workmanship are of high quality. There is an adequate bibliography.

Fractures and Other Bone and Joint Injuries. By R. Watson-Jones, B.Sc., M.Ch.Orth., F.R.C.S., Consulting Orthopaedic Surgeon, Royal Lancaster Infirmary, Lancaster. Cloth. Price, \$13.50. Pp. 723, with 1,019 illustrations. Baltimore: William Wood & Company, 1940.

The scope of this book goes far beyond the usual territory covered in books on fractures and dislocations. It includes all traumatic situations, including sprains and muscular injuries, and its principal virtue is the extreme thoroughness with which this field is covered in all details. The general principles which are announced at the beginning of the book are extremely sound and splendidly presented. Of particular value are the chapters on constitutional conditions in which trauma is the contributory factor. There is also an excellent chapter on vascular necrosis or aseptic necrosis in relation to trauma and an equally good one on vascular injuries complicating fractures. The chapter on nerve complications contains not only the treatment but also diagnosis and differentiation attendant on nerve injuries. One of the most important contributions is the presentation of the principles of fracture reduction, manipulative, standard of the reduction, plaster technic, traction, fixed and balanced, and transfixion technic. Everything is described in minute detail. The second part of the book deals with pathologic fractures, and here particularly the osteo-arthropathies and osteomalacias are of interest. Birth fractures are described in a separate chapter. In the third part the regional description of fractures is presented. Particularly attractive is the chapter on injuries of the trunk and head, and on the fractures and subluxations of the vertebrae. It is followed by an equally excellent chapter devoted to low back pain and sciatica with a splendid presentation of diagnosis and treatment. Of great value also are the chapters of the injuries of the shoulder, the section on peri-arthritis and the injuries and fractures of the elbow, particularly the supracondylar fractures. Fractures of the upper end of the femur and neck of the femur are given an equally thorough consideration. There are also the injuries of the knee and the ankle in special chapters. It would be going too far to point out all the excellent features of the book, which repeat themselves in every succeeding chapter. Presentation is superb, the illustrations are excellent, the material produced is rich, the roentgenograms are of the first quality. All in all, a most excellent book of almost overwhelming thoroughness, practical presentation, and most attractively and artistically edited.

The Diagnosis and Treatment of Pulmonary Tuberculosis. By John B. Hawes 2d, M.D., and Moses J. Stone, M.D., Assistant Professor of Medicine, Boston University School of Medicine, Boston. With a foreword by Richard C. Cabot, M.D. Second edition revised by Dr. Moses J. Stone. Cloth. Price, \$2.75. Pp. 260, with 75 illustrations. Philadelphia: Lea & Febiger, 1940.

This book was apparently designed for medical students and general practitioners. Adhering strictly to the subject and considering the authors' avowed purpose of presenting "a brief concise textbook," it is obvious that the book contains some superfluous material and in certain chapters there is a crying need for a clearer statement of fundamental facts, a more detailed description of symptoms and signs and methods of procedure. The reader often comes to the end of a sentence longing for one or two additional words or he rounds out a paragraph wishing for another sentence for clarification. The medical student and the average doctor wanting in knowledge and experience to spread between the lines will close certain chapters with a feeling of confusion and disappointment. The chapter on roentgen ray diagnosis may be cited as an example. In this chapter considerable space is devoted to a discussion of pathologic types of pulmonary tuberculosis without giving a detailed description of the roentgen appearances in the respective types. The illustrations are good but the legends are not fully descriptive and they are not clearly identified with the text, which also is wanting in the matter of explicit interpretation. The same may be said of the illustrations in other chapters. On

the whole, this little volume contains much valuable material and many practical features which are not to be found in many of the more comprehensive textbooks. The historical approach is good and should help to arouse interest. The chapter on history taking is logically presented with a sound psychologic approach. The chapter on sanatorium treatment is good but it does not sufficiently stress the importance of the education of the patient and adequate follow-up after the sanatorium treatment is completed. The comparison of home and sanatorium treatment is well handled. Collapse therapy is brought down to the present with a brief but sound discussion. The authors are to be commended for their decided stand against preventoriums and summer camps "for individuals who have primary tuberculosis," also because of their conservative attitude toward climate and other controversial procedures, such as extrapleural pneumothorax and oleothorax.

Minor Surgery. By Frederick Christopher, S.B., M.D., F.A.C.S., Associate Professor of Surgery at the Northwestern University Medical School, Chicago. With a foreword by Allen B. Kanavel, M.D., F.A.C.S. Fourth edition. Cloth. Price, \$10. Pp. 990, with 639 illustrations. Philadelphia & London: W. B. Saunders Company, 1940.

That this is the fourth edition in eleven years attests the popularity of this book and the immensely practical task it fulfills. The collection of a tremendous amount of authoritative data freely fortified by numerous and recent references is, in itself, a considerable accomplishment. The large amount of material included occasionally permits a slight element of confusion to creep in. Quotations from a number of authorities lend credence to a point of view without justifying its inclusion in a book of this nature. A good portion of the book has been prepared with the surgical intern and resident in mind.

It is interesting to note that the injection technic for inguinal hernia has been properly omitted despite its reported good results in the hands of a limited number of experts. Future editions will no doubt contain even less controversial matter as the fields of major and minor surgery grow more distinct. As the author states, no one knows exactly what is minor surgery; but it covers a myriad of conditions of lesser debilitating character. First aid treatment, also included in this book, is often preliminary treatment of injuries of serious nature. The definition of minor surgery as evaluated in this book can be summarized as major procedures on minor diseases and minor procedures on major diseases.

The author has assembled this vast array of material with considerable circumspection, cohesion and clarity. The value of the book in traumatic surgery cannot be denied in an age of increasing mechanical accidents. The methods of handling injuries to the extremities, fractures of the smaller bones, splinting and first aid treatment are well described. There are numerous illustrations obtained from the publications of competent authorities. This volume can be recommended to every surgical intern, resident and practicing physician.

Der gehemmte Mensch: Grundlagen einer Desmologie als Beitrag zur Tiefenpsychologie. Von Dr. med. Harald Schultz-Hencke. Paper. Price, 16.80 marks. Pp. 323. Leipzig: Georg Thieme, 1940.

This book is a typical outgrowth of German "science" of today, evidently written to prove to the political overseers of medical science in that country that the author is no longer to be regarded as contaminated by the "Jewish science" psychoanalysis with which he was formerly identified. Compilations from unquoted sources and an arbitrary choice of facts to fit a preconceived system are its main characteristics. Many of the discoveries of Freud are accepted as being matters of common knowledge, but Freud is never given any credit; he is quoted only when the author disagrees with him, which is quite often, or wishes to reproach him for having introduced confusing terms and erroneous conceptions. The author himself introduces a few new terms, such as "captive" and "retentive" tendencies, which he thinks clear matters up immensely. He denies the existence of infantile sexuality, although he furtively exploits many of the deductions drawn from Freud's observations of these phenomena. Not only Freud but other authorities are ignored in favor of the presumption that the author is the originator of his confused collection of psychiatric observations and theories. The book is not worth reading except as an illustration of how state politics can ruin medical science.

A Handbook for Dissectors. By J. C. Bolleau Grant, Professor of Anatomy, University of Toronto, Toronto, and H. A. Cates, Associate Professor of Anatomy, University of Toronto. Being a Companion to "A Method of Anatomy" by J. C. Bolleau Grant. Third edition. Fabrikoid. Price, \$2.50. Pp. 239, with 9 illustrations. Baltimore: William Wood & Company, 1940.

This little book is intended for use with Grant's "A Method of Anatomy." Experience has evidently shown the need of directions for dissection additional to those contained in the larger book, hence this supplementary one. The directions are precise and clear. Endeavor has been made to help the student leave out something: the more important structures are printed in heavy type. This book and "The Method" together constitute an excellent guide to the first (and usually only) dissection made by medical students. Since the outlook of both books is toward clinical work in surgery and medicine, dissection under their guidance provides a good practical anatomic basis for further medical work. But students who are interested in anatomy rather from the biologic side, who seek to understand the principles of structure, its evolution, development and general plan, will go on to a study of the larger textbooks, perhaps with further dissection. Since this book is tied so closely to "The Method" by constant reference to its pages and its illustrations and is thus inseparable from it, one wonders if in future editions of "The Method" this little book might not be incorporated in it.

The Diabetic A B C: A Practical Book for Patients and Nurses. By R. D. Lawrence, M.A., M.D., F.R.C.P., Physician in Charge Diabetic Department, King's College Hospital, London. Seventh edition. Boards. Price, 3s. 6d. Pp. 64. London: H. K. Lewis & Co., Ltd., 1940.

The seventh edition of Dr. Lawrence's pasteboard covered manual for the use of patients is proof of its usefulness. It is short, concise, goes straight to the point and all concerned in the treatment of diabetes will approve of its orthodox character. The author's line ration scheme of prescribing has won more adherents in England than in this country. One line represents food containing the equivalent of 10 Gm. of carbohydrate, 7.5 Gm. of protein and 9 Gm. of fat. Dr. Lawrence believes in weighing diets, at least at the beginning of treatment, and at intervals thereafter. Of especial interest now is a part of the second paragraph of the preface: "So far the war has not brought any special hardships for diabetics, but I wish to mention two points about which I have received hundreds of enquiries. First, vitaminised margarine is just as good as butter for the nutrition of diabetics. And second, diabetics can obtain an extra meat ration in exchange for sugar by applying to their local food office."

As the Twig Is Bent. By Leslie B. Hohman, M.D., Associate in Psychiatry, Johns Hopkins Medical School, Baltimore. Cloth. Price, \$2.50. Pp. 291. New York: Macmillan Company, 1940.

This is a collection of twenty-six essays on child guidance written for parents in an unusually readable literary style by a psychiatrist. The book will be enjoyed by parents because of the many well portrayed examples of human problems and the breeziness with which the author demonstrates their possible solutions. "Common sense" seems to be the solution for all psychologic problems, which thus evaporate like mist before the morning sun. The author is not a child psychiatrist and his naïveté which pervades the book and gives it such an optimistic note is ample evidence of his lack of experience in dealing with the "bent twig." Rules, precepts and logic, but not one sentence indicating a basic understanding of the child's emotional life.

Bibliografiya Russkoy radiologii i rentgenologii za 1896-1938 gg. [By] A. E. Molotkov. Pod redaktsiyey I. S. predslavlyem M. I. Nemenova. Vypusk 1. Radiy i radioaktivnye veshchestva rykhodit k 40-letiyu so dnya otkrytiya radiya (1898-1938). Bibliographie de radiologie et de roentgenologie russe pour la période 1896 à 1938. Fascicule 1. Radium et substances radioactives paru à l'occasion du quarantenaire de la découverte du radium (1898-1938). Paper. Price, 4 rubles. Pp. 55. Leningrad: Izdanie Gosudarstvennogo Rentgenologicheskogo, Radiologicheskogo i Rakovogo Instituta i Vsesoyuznogo Instituta Eksperimental'noy Meditsiny imeni A. M. Gorkogo, 1938.

The aim of the publishers is to collect all the Russian literature on the subject of roentgen and radium radiation therapy. The present volume is devoted to the cataloguing of all the available literature in Russian on the subject of radium from 1896 to 1938. Some 700 titles are listed.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Clinical Pathology, Baltimore

10:511-592 (Aug.) 1940

- Histopathology of Defective Scar of High Cesarean Section and Mechanism of Subsequent Rupture of Uterus. N. W. Elton, Buffalo.—p. 511.
- Rapid Flocculation Test for Syphilis Adapted to Cerebrospinal Fluid. W. F. Lorenz, Madison, Wis.—p. 527.
- Pathologic Classification of Diseases of Myocardium. G. E. Brown Jr. and H. F. Hunt, Danville, Pa.—p. 540.
- Unusual Manifestations of Infectious Mononucleosis. W. M. Fowler and R. T. Tidrick, Iowa City.—p. 548.
- Steatoirrhosis of Liver. L. C. McGee, F. Levy and J. E. Martin Jr., Elkins, W. Va.—p. 554.
- Human Infection with Bacillus Necrophorum. W. B. Martin, Norfolk, Va.—p. 567.
- "False" Positive Paul-Bunnell (Heterophile) Reaction? C. F. Kent, Kansas City, Mo.—p. 576.

American J. Digestive Diseases, Huntington, Ind.

7:365-400 (Sept.) 1940

- Body Build of Male Ulcer Patient. S. C. Robinson and M. Brucer, Chicago.—p. 365.
- *Evaluation of Meulengracht Regimen in Treatment of Bleeding Peptic Ulcer. J. Chasnoff, S. Leibowitz and R. Schwartz, New York.—p. 373.
- Functional Bowel Disturbance and Milk Allergy: Bedside Diagnosis. L. Cardon, Chicago.—p. 378.
- Studies in Human Biliary Physiology: V. Influence of Metabolizable and Nonmetabolizable Sugars on Liver Bile Secretion. M. Jacobi, I. C. Zuckerman, B. Kogut and B. Klein, Brooklyn.—p. 382.
- Secretory Studies in Whole Stomachs: Dilution Indicator Technique and Its Precision Measures. F. Hollander and J. Glickstein, New York.

Meulengracht Regimen in Bleeding Peptic Ulcer.—

The essential features of Meulengracht's method, according to Chasnoff and his associates, are that the patients are fed from the very onset of hemorrhage and that they receive liberal food allowance consisting of a puréed high caloric, high vitamin diet. Meulengracht had observed that many patients who had not sought medical aid and had continued on their usual diet apparently made uneventful recoveries, that some patients with protracted hemorrhage stopped bleeding when fed and that some patients, despite the most rigid dieting, died, apparently from exhaustion rather than from the extent of the hemorrhage. Thus he was prompted to change the treatment of bleeding peptic ulcer. Chasnoff and his collaborators present mortality statistics of all cases treated with the Meulengracht regimen which have appeared in the literature and compare these with the statistics of the older methods of treatment. The mortality rate with the Meulengracht method was much lower than the rates reported by those employing either the former medical regimen or surgery. Chasnoff and his co-workers employed the Meulengracht procedure for twenty-one patients, all of whom showed evidence of fairly extensive loss of blood. For comparative purposes the authors studied the results obtained in an unselected group of seventy-two patients treated with the older "starvation-Sippy" method. Among the twenty-one patients treated with the Meulengracht diet there was one death, or a mortality rate of 4.76 per cent. In the control group eight deaths occurred, which brings the mortality to 11.1 per cent. The patients receiving the liberal feeding of the Meulengracht diet manifested a well-being not noted in those under the older method of treatment. The duration of the hospitalization was not reduced by the Meulengracht method, for, whereas the patients on the "starvation-Sippy" diet averaged twenty-one days of hospitalization, those on the Meulengracht regimen averaged twenty-seven days. These figures differ from those reported by Meulengracht

and others. The percentage of perforation was higher for patients treated with the Meulengracht method than for those treated with other methods. The authors suggest that the increased feedings might possibly play a part.

American Journal of Diseases of Children, Chicago

60:471-782 (Sept.) 1940

- Systemic Reticulo-Endothelial Granuloma: Nonlipoid Reticulo-Endotheliosis and Schüller-Christian Disease. A. Wallgren, Göteborg, Sweden.—p. 471.
- Schilling Blood Count in Juvenile Lobar Pneumonia Treated with Sulfapyridine: Preliminary Report. J. L. Rogatz, New York.—p. 501.
- *Effect of Varied Banana Intake on Nitrogen and Mineral Balances of Normal Children. Helen A. Hunscher, Frances Cope Hummel and Icie G. Macy, with cooperation of Mary Bates Olson, Priscilla Bonner, J. Horton, Marion L. Shepherd, Helen J. Souders, Louise Emerson and A. Theresa Johnston, Detroit.—p. 509.
- Intestinal Parasites in Children in Toronto. E. Kuitunen-Ekbaum, Toronto.—p. 518.
- Hospital Mortality and Morbidity of Infantile Eczema. J. Glaser, Rochester, N. Y., and W. M. Edwards, Washington, D. C.—p. 526.
- Cow's Milk Treated by Base Exchange for Infant Feeding: Metabolism of Calcium, Phosphorus and Nitrogen. J. H. Hess, H. G. Poncher, Helen Woodward Wade and Jeannette C. Ricevasser, Chicago.—p. 535.
- Absorption of Poliomyelitis Virus by Possibly Deficiently Medullated Nerves. J. A. Toomey, Cleveland.—p. 548.
- *Therapeutic Procedures for Scarlet Fever: Comparative Studies. H. Rascoff and S. Nussbaum, Brooklyn.—p. 552.
- Etiology of Multiple Deformities. D. Engel, Edinburgh, Scotland.—p. 562.
- Nondiabetic Glycosuria in Children: Report of Nine Cases. Leona M. Bayer and J. H. Davis, San Francisco.—p. 580.
- Regional Obstructive Pulmonary Emphysema in Infants and in Children: Emphysematous Cavities and Their Similarity to Necrotic Cavities, Congenital Pulmonary Cysts and Loculated Pneumothorax. J. Caffey, New York.—p. 586.
- Estimation of Vitamin D in Blood Serum: II. Level of Vitamin D in Human Blood Serums. J. Warkany and Helen E. Mahon, Cincinnati.—p. 606.
- Experimental Studies on Immunity in Diphtheria. M. Weichsel, New York.—p. 615.
- Effect of Fetal Activity on Nutritional State of Infant at Birth. L. W. Sontag, Yellow Springs, Ohio.—p. 621.
- Evaluation of Tuberculin Patch Test. A. H. Fineman and G. Bair, New York.—p. 631.
- Simple Mechanical Aid in Treatment of Acute Rhinitis of Infancy. D. B. Landau, Hannibal, Mo.—p. 635.
- Relative Ease of Interference with Growth and Development in Guinea Pig. M. B. Cohen, Cleveland.—p. 636.
- Surgical and Medical Treatment of Exophthalmic Goiter of Children: Late Results. R. L. J. Kennedy, Rochester, Minn.—p. 677.

Banana Intake and Nitrogen and Mineral Balances.—

Hunscher and her associates studied the effect on mineral balances of 100 or 200 Gm. daily of banana added to the diets of eight normal healthy children from 5 to 8 years of age. The children experienced three months of preliminary feeding and at least two weeks of training in metabolic technique. They lived in an environment that stimulated normal happy, healthful living. Each child was observed for from fifty to ninety consecutive days and no test interval was shorter than twenty days, the majority being from thirty to forty-five days in length. The data for the eight children for the preexperimental period is a total of 275 days and for the experimental period 285 days. A definite consistent metabolic response was noted to the increased banana intake. Data on the mineral accumulation of the eight children were averaged for each of the two periods. All the children grew during the study and showed consistent changes in metabolism in response to the inclusion of the larger quantity of banana in the diet. The daily addition of 100 Gm. of banana enhanced the rate of nitrogen storage from 17 to 22 mg. per kilogram of body weight daily, or from 3 to 4 per cent of the intake, although the nitrogen intake was reduced from 505 to 489 mg. per kilogram of body weight. Likewise the retentions of all the individual acid-base mineral elements were augmented if changed. The facts demonstrate that banana stimulated more rapid growth of both bone and soft tissue. The greatest difference between the alkaline-ash and acid-ash values of the diets without and with the additional 100 Gm. of banana was in their potassium content, 116 and 131 mg. per kilogram of body weight respectively. The apparent retention of this element increased from 8 to 10 mg. per kilogram daily. Although the daily calcium intake was reduced only by 1 mg. per kilogram of body weight, the apparent retention increased from 4 to 5 mg. per kilogram, indicating an enhanced rate of osseous development. The intake and retention of magnesium remained unchanged, and, although the sodium intake was reduced from 105 to 99 mg. per kilogram daily during the experimental period, the apparent

daily storage increased from 5 to 6 mg. per kilogram daily. By increasing the intake of banana the daily phosphorus intake was reduced by 3 mg. (from 53 to 50) per kilogram of body weight, yet the apparent retention was increased from 5 to 6 mg.; 70 per cent of the phosphorus retained is used in the formation of bone and 30 per cent becomes a component part of the soft tissue. The decreased intake of chlorine was accompanied by a higher retention. Although the daily intake of sulfur was reduced slightly (2 mg. per kilogram) its retention, essential to growth of soft tissue, increased from 1 to 4 per cent of the intake. As nitrogen is utilized it carries with it the major portion of the sulfur, from 30 to 40 per cent of the phosphorus retained and some of the potassium. There was a consistent relation between the percentage of nitrogen retained and the percentages of sulfur, phosphorus and potassium utilized. The increased storage of nitrogen was paralleled by augmented retentions of sulfur, phosphorus and potassium. An increase in the potassium:sodium ratios with the larger consumption of banana supports the belief that the formation of soft tissue was stimulated to a more rapid rate. Therefore banana in the diet has definite nutritive advantage but its *modus operandi* is still vague. The effect of the ascorbic acid or l-malic acid content of the fruit is not fully understood, but experimental work indicates that it stimulates excretion of citric acid and serves as an endogenous precursor of citric acid, which is considered a "physiologic metabolite."

Therapeutic Procedures for Scarlet Fever.—Rascoff and Nussbaum made a controlled study of 293 patients with scarlet fever so as to determine the value of sulfanilamide and scarlet fever antitoxin therapies singly and in combination. Depending on the severity of the illness each patient was placed in one of three groups: 125 patients of group 1 were admitted with "mild" (temperature of 100.5 F. or less with no toxicity or complications) scarlet fever and were treated symptomatically; 154 patients of group 2 were admitted with "moderately severe" (temperature of 101 F. or more, with toxicity and complications) scarlet fever and were treated, in rotation, with sulfanilamide, scarlet fever antitoxin, scarlet fever antitoxin or sulfanilamide or were given no therapy (control), and the fourteen patients of group 3 who were severely ill (temperature of 104 F. or more, with marked prostration and complications) were given scarlet fever antitoxin or scarlet fever antitoxin and sulfanilamide. The average age of group 1 patients was 8.6 years and the mean day of the illness on admission was 2.9. Signs present on admission were usually a slight rash, associated with a "strawberry" tongue, and a mild angina. A number of these patients were sick at home for several days and on admission were afebrile. The 125 patients with mild scarlet fever (41 per cent of all admissions) indicate the benign nature of the disease that is prevalent today. During the stay in the hospital adenitis developed in eight, otitis in two, tonsillitis in two and ethmoiditis in one. Four of the eight patients with adenitis received sulfanilamide and four did not. The course of the adenitis seemed to be unaffected by the therapy. The mean duration of the group 1 patients' stay in the hospital was 21.7 days. The average age of forty-one patients of group 2 receiving sulfanilamide was 7.4 years, the mean day of disease on admission 2.6, the mean duration of initial pyrexia while hospitalized was 2.6 days, there were six complications (three adenitis, two otitis media and one mastoiditis) and the mean duration of hospital days was 25.4. The respective figures for the forty patients receiving scarlet fever antitoxin were 10.5 years, 2.8, 2.5 eight (two adenitis, four otitis media, one arthritis and one nephritis) and 21.6 days; for the thirty-one given sulfanilamide and scarlet fever antitoxin they were 8.6 years, 3.0, 1.9, five (three adenitis and two otitis media) and 23.8, and for the forty-two given no treatment the figures were 7.8 years, 3.1, 2.5, thirteen (six adenitis, five otitis media, one tonsillitis and one ethmoiditis) and 25.5. The patients receiving the combined therapy apparently had a shorter duration of initial pyrexia (1.9 days) in the hospital, but this advantage was offset by the longer duration (three days) of the disease prior to admission to the hospital as compared to the other subgroups (2.6, 2.8 and 3.1 days). The greatest number of complications developed in patients receiving no therapy. The ages of the fourteen group 3 patients varied between 2 and 12 years, the day of illness on admission

from one to eight, only four patients had no complications (four had tonsillitis, one adenitis, one otitis media, one otitis media and arthritis, one petechial rash and tonsillitis, one otitis media and pneumonia and one otitis media and pneumonia with effusion) and days in the hospital varied from seven to 159. One patient died of sepsis thirty-six hours after admission. The patients of this group were seriously ill and every possible aid was given them and therefore most of them were given sulfanilamide and those with pulmonary complications received sulfapyridine. The results of the study show that sulfanilamide in scarlet fever is not as beneficial as it is in certain other streptococcal infections. It does not diminish the toxicity or duration of the fever. Frequently the malaise is intensified by the drug. In view of the prevailingly favorable opinion and its availability, sulfanilamide should be given in severe and moderately severe scarlet fever until evidence to the contrary is produced. Scarlet fever antitoxin or convalescent serum successfully combats the initial toxic phase and should be given early in the disease.

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- Dysphagia with Disorders of Heart and Great Vessels. A. L. Bloomfield, San Francisco.—p. 289.
- Further Experience with Globin Insulin. L. Bauman, New York.—p. 299.
- Levulosuria: Study of Two Cases in Brothers. V. C. Jacobsen, Troy, N. Y.—p. 304.
- *Studies on Preservation of Human Blood. J. A. Kolmer, with assistance of Mary Howard, Philadelphia.—p. 311.
- Vitamin C in Chronic Lead Poisoning: Experimental Study. L. Pillemer, J. Seifter, A. O. Kuehn and E. E. Ecker, Cleveland.—p. 322.
- Plasma Coagulation Time as Simple Test for Vitamin K Deficiency. G. Cheney, San Francisco.—p. 327.
- QRS Pattern of Diagnostic Value in the Electrocardiogram. W. A. Soderman and H. T. Engelhardt, New Orleans.—p. 337.
- Vascular "Spider" Associated with Cirrhosis of Liver. A. J. Patek Jr., J. Post and J. C. Victor, New York.—p. 341.
- Temperature and Brain Metabolism. H. E. Himwich, Albany, N. Y.; K. M. Bowman, New York; J. F. Fazekas, Albany, N. Y., and W. Goldfarb, New York.—p. 347.
- Pathologic Changes Following Prolonged Administration of Sulfathiazole and Sulfapyridine. G. Rake, H. B. van Dyke and W. C. Corwin, New Brunswick, N. J.—p. 353.
- Peripheral Neuropathy and Toxic Psychosis with Convulsions Due to Sulfamethylthiazole: Report of Case. C. F. Garvin, Cleveland.—p. 362.
- Sulfapyridine in Treatment of Gonococcal Infections After Sulfanilamide Failure. C. Ferguson, M. Buckholtz and R. A. Hingson, Staten Island, N. Y.—p. 365.
- Treatment of Falciparum Malaria of Drug Addicts. H. Most and N. Joffile, New York.—p. 367.
- β Methylcholine Urethane: Its Action in Various Normal and Abnormal Conditions, Especially Postoperative Urinary Retention. I. Starr and L. K. Ferguson, Philadelphia.—p. 372.
- *Allergic Intestinal Bleeding in the Newborn: Clinical Syndrome. M. I. Rubin, Philadelphia.—p. 385.
- *Incidence of Aspirin Hypersensitivity. Emily Gardner and W. B. Blanton, Richmond, Va.—p. 390.
- Motility and Chemotaxis of Leukocytes in Health and Disease. O. T. Mallery Jr. and M. McCutcheon, Philadelphia.—p. 394.

Preservation of Human Blood.—Kolmer preserved the blood of two adult donors belonging to groups A and B with four different preservatives for twenty-one days at from 4 to 6 C. Of the four preservatives employed, two were without carbohydrate (plain citrate and Moscow Institute of Hematology), one with dextrose (modified Rous-Turner) and one with dextrin (Maizels and Whittaker). The blood was examined within twenty-four hours and at the end of three, five, seven, ten, fourteen and twenty-one days for dehemoglobinization, fragility and preservation of erythrocytes and leukocytes. Special attention was paid to the neutrophils and the preservation of platelets, prothrombin, iso-agglutinins, complement and bactericidal activity. The two carbohydrate preservatives gave better protection of erythrocytes against dehemoglobinization, fragility and disintegration than the plain citrate and Moscow Institute of Hematology preservatives. The platelets and leukocytes were markedly reduced within three days with all four preservatives. The two carbohydrate preservatives gave somewhat better preservation than the two without dextrose or dextrin. The neutrophils were disintegrated. A slight decrease in prothrombin time (Howell) was observed with the plasmas of all preserved blood within the first twenty-four hours after its collection. This was due to disintegration of platelets. Dur-

ing the following three to seven days this was followed by an increase presumably due to loss of prothrombin. The iso-agglutinins showed no decrease during the first ten days with all four preservatives, but some diminution occurred after fourteen and twenty-one days. This was somewhat less marked with the two carbohydrate preservatives. Complement was well preserved by all four preservatives for the first seven to ten days. The bactericidal activity of the plasmas for *Bacillus typhosus* was well preserved by all four preservatives for seven days, following which rapid deterioration occurred.

Allergic Intestinal Bleeding in the Newborn.—The occurrence of intestinal hemorrhage as an allergic manifestation in infants, according to Rubin, has escaped description in the pediatric literature. During the last three years he has observed six such cases. The patients' histories are so dramatically identical, differing only as to minor details, as to form a definite clinical syndrome. There was in each instance a strong family history of allergy, usually bilateral, and cow's milk feeding was started immediately or within a few days after birth. Hunger or what was thought by the mother to be hunger was a constant complaint. This "hunger" probably represented abdominal discomfort and was manifested as "colic." Despite this, gain in weight was not impeded; in fact, it was above the average. The "colic" first appeared about three weeks after cow's milk feeding and became progressively worse. Within a few days loose stools appeared, soon to contain mucus and varying amounts of bright red blood. The blood promptly and completely disappeared from the stools within forty-eight hours after cow's milk was withdrawn from the diet. The mucus in the stools and the "colic" disappeared shortly afterward. In two of the children the "colicky" pains were associated with visible large gastric peristaltic waves indicative of pylorospasm. This was probably a part of the generalized gastrointestinal spasm which disappeared when the other symptoms were relieved. Diathetic eczema developed in all but one of the infants within a few months after the onset of the intestinal symptoms. One child also had asthma. Bleeding from any other part of the body was not observed. The bleeding and clotting times were normal. Bleeding from the intestinal tract did not recur after the cow's milk was withdrawn, except in one baby who also was sensitive to goat's milk. The melena disappeared when goat's milk was withdrawn and the child placed on a soybean mixture. The other infants tolerated goat's milk well.

Acetylsalicylic Acid Hypersensitivity.—Gardner and Blanton reviewed the histories of 467 private and clinic patients to determine the incidence of acetylsalicylic acid sensitization. More than half of the patients had asthma. All of them were regarded as having some sort of allergy. Salicylates may have influenced the development of allergic symptoms in five. A patient with angioneurotic edema involving the lips, cheeks and eyelids thought the taking of a tablet containing acetylsalicylic acid, acetanilid, potassium bromide and caffeine precipitated her attacks. Another patient thought the same product might cause an attack of asthma to develop. A patient with angioneurotic edema thought her attacks were induced by acetylsalicylic acid and a powder containing the ingredients of the aforementioned tablet. A patient with asthma complained of nausea after taking acetylsalicylic acid. Another reported that wheezing sometimes followed the use of salicylates. Dramatic consequences were not encountered. Fifty allergic patients were questioned whether any of the following symptoms occurred after taking acetylsalicylic acid: gastric discomfort, tachycardia, mental exhilaration, nausea, vomiting, diarrhea and ringing in the ears. They were also questioned about their experience in taking quinine. Forty-four of these fifty patients suffered from asthma, three had atopic dermatitis, one urticaria, one vasomotor rhinitis and one hay fever. All but three admitted taking acetylsalicylic acid or a compound containing it. Only four experienced unpleasant symptoms which they thought referable to it; two had rapid pulse and flushing, one had a depressed feeling and one complained of wakefulness. Of its effects on the allergic disorder itself, thirty-three stated they had never taken it for this purpose, five that it had had no effect and twelve thought it beneficial. In none were allergic symptoms provoked. It was found that seventeen had

never knowingly taken quinine. Those who had used it had done so only occasionally. Rashes had followed its use in two cases, and dizziness resulted in one instance. Allergic symptoms were not provoked. To throw further light on the hypersensitivity of allergic patients to acetylsalicylic acid the authors gave 5 grains (0.32 Gm.) of the drug to each of 103 consecutive patients admitted to the immunology clinic, after a negative history of such sensitivity was secured. Each patient was observed at the end of ten, thirty, sixty and 120 minutes. Fourteen maintained that "the medicine" had made them feel better. Two patients with asthma stated that they had a slight sense of constriction in the chest. The symptoms were transitory and may not have been the result of the drug. None of these 103 patients reacted violently. Of approximately 90,000 allergic patients seen by twenty-two allergists 170 had shown evidence of sensitivity to acetylsalicylic acid. This represents two per thousand. Among the same group, seventy-one instances of quinine sensitivity were reported. Study of the annual consumption of acetylsalicylic acid and quinine in this country shows that 5,143,672 pounds of acetylsalicylic acid was sold in the United States in 1937. This represents an average annual consumption of one half ounce (240 Gm.) or forty-eight tablets by each person. In the same year 3,458,009 ounces of quinine was consumed in this country. Therefore about seventeen times as much acetylsalicylic acid as quinine is consumed. If, out of a group of 90,000 allergic individuals, 170 were sensitive to acetylsalicylic acid and seventy-one to quinine, the chance of a given individual's being sensitive to quinine is seven times as great as is his chance of being sensitive to acetylsalicylic acid. These figures do not suggest that acetylsalicylic acid ranks first among allergy producing chemicals.

Archives of Internal Medicine, Chicago

66:531-784 (Sept.) 1940

- Spontaneous Hypoglycemia Due to Atrophy of Adrenal Glands: Report of Case. J. G. Rushton, R. W. Cragg and L. K. Stalker, Rochester, Minn.—p. 531.
- Hypertension (Goldblatt) and Unilateral Malignant Nephrosclerosis. O. Saphir and J. Ballinger, Chicago.—p. 541.
- Pulmonary Infection and Necrosis in Diabetes Mellitus: Report of Case of Dissecting Necrotic Pneumonia Complicating Pancreatic Lithiasis. S. E. Moolten, New York.—p. 561.
- Structural Changes in Arterioles of Myocardium in Diffuse Arteriolari Disease with Hypertension Group 4. H. M. Odel, Rochester, Minn.—p. 579.
- Fatty Degeneration of Heart Causing Myocardial Insufficiency: Report of Case. C. F. Garvin, Cleveland.—p. 603.
- Diabetes Insipidus Associated with Diabetes Mellitus: Metabolic Studies and Report of Case. J. H. Talbott, F. S. Coombs, W. V. Consolazio and L. J. Pecora, Boston.—p. 607.
- Arterial Blood Pressure in Cases of Auricular Fibrillation, Measured Directly. W. C. Buchbinder and H. Sugarman, Chicago.—p. 625.
- *Renal Involvement in Disseminated Lupus Erythematosus. J. M. Stickney and N. M. Keith, Rochester, Minn.—p. 643.
- Measurement of Vitamin A Status of Young Adults by Dark Adaptation Technique. Evelyn Lyman Blanchard, Davis, Calif., and H. A. Harper, Los Angeles.—p. 661.
- *Protamine Zinc Insulin: Clinical Study: Report of Group of Diabetic Patients in Whose Cases Glycosuria Was Disregarded for One Year. E. Tolstoi and F. C. Weber Jr., New York.—p. 670.
- *Evaluation of Vitamin B Therapy for Diabetes. L. B. Owens, S. S. Rockworn and Edna G. Brown, Cincinnati.—p. 679.
- Pancreatic Secretion in Man After Stimulation with Secretin and Acetyl-Beta-Methylcholine Chloride: Comparative Study. M. W. Comfort and A. E. Osterberg, Rochester, Minn.—p. 688.
- Vascular Diseases: Review of Some Recent Literature, with Critical Review of Surgical Treatment. G. W. Scupham, G. de Takáts, T. R. Van Dellen and W. C. Beck, Chicago.—p. 707.

Renal Involvement in Disseminated Lupus Erythematosus.—Stickney and Keith summarize visceral involvement in disseminated lupus erythematosus and analyze the renal, clinical and necropsy manifestations observed in fifteen cases that came to postmortem at the Mayo Clinic between January 1913 and July 1939. The clinical and microscopic diagnosis was proved in every instance. Uremia was the terminal point of the disease in only four cases, with a blood urea of more than 60 mg. per hundred cubic centimeters. In these and in five others fairly constant albuminuria, microscopic hematuria and cylindruria were present. The urinary changes closely paralleled the severity of the cutaneous symptoms of most of the cases. All studies of renal function indicated good function until the final stages of the disease. In two cases albuminuria preceded the cutaneous lesions. In the others the cutaneous symptoms preceded the albuminuria, and the time between the

onset of albuminuria and death varied up to eighteen months. Cotton wool exudates were observed in the ocular fundi in one case and small hemorrhages in another. In three there was evidence of angiospasm in the retinal arterioles. The weights of all the kidneys were normal or greater than normal. Definite hypertrophy was encountered three times, and in none of these was there much interstitial edema. Hypertrophy of the liver was present in two cases. The absence of renal contraction is consistent with the fact that severe hypertension was not found. There were no significant changes in the renal arteries and arterioles. A typical pyelonephritis was not found. The most common microscopic observation was an increase in the endothelial cells of the glomerular tufts with a reduction of the erythrocytes in the capillary loops. Some degree of proliferation of endothelial cells was present in six cases. Hyaline eosin-staining material in the glomerular capillaries was observed in five cases and this probably represented a degenerative process. Definite fibers, which stained like and apparently were derived from the basement membrane, were seen within the glomerular capillaries in five cases in sections stained with azocarmine. Tubular damage, except in regions related to infarction, was minimal, although a few hyaline and granular casts were found in several cases. No significant deposit of lipid or amyloidosis was found. For comparison with the described renal changes, renal sections of eighty-five patients dying of various other causes and coming to necropsy were studied. Eleven of these had renal changes comparable to those seen in lupus erythematosus. These patients make up the "control series." The renal changes in the control series, which did not include any with known renal disease, were as marked as most of those seen in the lupus erythematosus series, but the intracapillary hyaline changes were not seen in the control group. These intracapillary hyaline changes were similar to the lesion seen frequently in bacterial endocarditis. If in disseminated lupus erythematosus the renal disorder is an acute glomerulonephritis, it must be concluded that its duration does not coincide with that of the albuminuria and hematuria but that it is a terminal process. Other possibilities might be that the disorder is a peculiar variety of nephritis with a low virulence or that it is a degenerative process secondary to a toxic debilitating disease.

Protamine Zinc Insulin.—Tolstoi and Weber observed for fifty and sixty days respectively two hospitalized patients who received one dose of protamine zinc insulin daily and a diet of 1,640 calories, composed of 75 Gm. of protein, 60 Gm. of fat and 200 Gm. of carbohydrate. They concluded that satisfactory treatment of diabetes mellitus with protamine zinc insulin involved the following criteria: (1) maintenance of weight, (2) absence of ketone bodies in the urine and (3) freedom from thirst, polyuria, frequency of urination, hunger, weakness, fatigue, polyphagia, pruritus and visual disturbances. They felt that it was the utilization and not the excretion of carbohydrates which was of prime importance and that glycosuria was not an undesirable feature, as it protected the patient from reactions. They have treated eighty-four ambulatory patients with one daily injection of insulin for at least one year and made no effort to maintain the urine free from sugar. Only twenty-seven had persistent glycosuria throughout the period of observation. These twenty-seven were in good health and socially and economically useful. Not only did the majority of them maintain their weight but some gained weight, even though heavy glycosuria was almost always present. There were no complaints or symptoms associated with the glycosuria, and infections were no more frequent than in those whose urine was usually free from sugar. All these patients enjoyed much more freedom, as there was no necessity for careful dietary measurements nor did they need to carry their syringe and insulin. They administered the insulin to themselves every morning, were not singled out as a group apart from their fellow men, and their habits of living approximated the normal ones. There is no evidence to show that, with protamine zinc insulin, utilization of carbohydrates does not take place in spite of hyperglycemia and glycosuria. Glycosuria has so dominated the study of the treatment of diabetes that the factor of utilization has been almost totally ignored. It has been established by Allen and Du Bois and their associates that for short periods the diabetic patient, irrespective

of the severity of the disorder, is capable of physiologically utilizing carbohydrate. Today the physiologic utilization of carbohydrates can be prolonged by insulin. Therefore hyperglycemia and glycosuria must be of secondary importance. The most important and physiologic basis for satisfactory treatment appears to be not how much sugar is excreted but how much is metabolized. Bridge and Winter have demonstrated that in an insulin-treated diabetic person carbohydrate is utilized in the presence of hyperglycemia and sequential glycosuria. They conclude that neither the value for blood sugar nor the degree of glycosuria is an adequate criterion for the regulation of diabetes. Their conclusion is particularly applicable to patients treated with protamine zinc insulin. The authors feel that if a state of carbohydrate utilization can be maintained in the diabetic person (and this is readily accomplished by the use of protamine zinc insulin) a physiologic state has been created and that the guiding principles for such a status in the presence of glycosuria and hyperglycemia are the three criteria listed.

Vitamin B Therapy for Diabetes.—Good results have been claimed from the administration of thiamine and ascorbic acid to persons with diabetes. Owens and his co-workers have undertaken a similar study of twenty-five diabetic patients well standardized for from six to eighteen months prior to vitamin therapy. Under conditions of adequate control, thiamine and riboflavin were found to produce no noticeable alteration in the diabetic state except for amelioration of neuritic pain by thiamine. Vitamin therapy for diabetes would seem to be without basis in fact. Diabetic patients regularly show a reduction in insulin need as the months of adequate control pass and eventually a basic level is reached requiring no change unless infection or other intercurrent disease upsets the established balance. Therefore for well controlled diabetes there appears to be no need for thiamine or riboflavin beyond the amounts present in ordinary diabetic diets, except for diabetic neuritis, on which thiamine has almost a specific effect. In most cases of such neuritis improvement also occurs when the diabetes is controlled by proper diet and insulin. This might suggest a thiamine deficiency during the uncontrolled period, but the possibility also exists that the improvement in neuritis results only from increased tissue combustion of sugar under insulin therapy and not from a specific lack of thiamine. Actual and severe vitamin deficiency may play a part in diabetic coma when food and vitamin intake ceases and the presence of fever enhances combustion. The usual methods of treating coma do not provide for any replenishment of vitamins. The most severe evidences of damage due to coma occur in the tissues with the highest rate of combustion and therefore with the greatest need for the vitamin B fractions—the brain, the kidney and the heart muscle. Diabetic coma still presents an unsolved clinical problem, with a fatality rate as high as in the early days of insulin therapy.

Archives of Otolaryngology, Chicago

32:417-610 (Sept.) 1940

- *Aviation Deafness—Acute and Chronic. P. A. Campbell, Chicago, and J. Hargreaves, Washington, D. C.—p. 417.
- Certain Reactions of Laryngeal Tissues to Medicinal Agents. R. A. Fenton, with collaboration of O. Larsell, Portland, Ore.—p. 429.
- Myasthenia Laryngis: Observations on Larynx as an Air Column Instrument. C. Jackson, Philadelphia.—p. 434.
- Nystagmography: Method for Graphic Recording of Nystagmus During and After Turning and of Caloric Nystagmus. F. H. Linthicum, Los Angeles.—p. 464.
- Laryngologic Aspects of Sporadic Infectious Mononucleosis. W. E. Grove, Milwaukee.—p. 472.
- Cancer of Larynx: Analysis of 250 Operative Cases. L. H. Clerf, Philadelphia.—p. 484.
- Osteoma of Maxillary Sinus: Report of Case. A. G. Rawlins, San Francisco.—p. 499.
- Brittle Bones Associated with Deafness and Blue Scleras: Report of Syndrome in Two Persons of One Family. M. S. Fox and S. J. Sweet, Milwaukee.—p. 506.
- Paranasal Sinuses. S. Salinger, Chicago.—p. 532.

Aviation Deafness.—Campbell and Hargreaves classify the deafness of aviators according to its cause: (1) acute fatigue of the end organ of hearing and related structures, (2) chronic accumulative fatigue of the end organ and related structures, (3) conduction deafness due to changes in pressure in the ear and (4) chronic conduction deafness due to alteration in the tissue resulting from faulty ventilation of the middle ear. The first two classifications are manifested by a decrease in hearing

acuity in the neighborhood of the 4,096 area—a perception deafness—and the last two by a decrease in the lower frequencies (from 128 to 1,024), a form of conduction deafness. Both types of deafness may be mixed to give any form of audiogram, which may be altered by the usual changes and hazards coincident with life. Fatigue of the end organ of hearing is due to noise and the effect of other vibratory energies inherent with flight. The 4,096 area is peculiarly vulnerable because of its exposed position and possibly altered blood supply. Altitudinal decrease in oxygen may be a factor in its production. Physiologic or pathologic failure of the middle ear to be properly ventilated during altitudinal changes in pressure leads to acute or chronic changes in the middle ear, with the usual picture of conduction deafness. Rapid advance in aircraft design (sound-proof cabins) and in flight regulation and education will decrease aviation deafness, making the problem less serious in the future.

Archives of Pathology, Chicago

30:651-842 (Sept.) 1940

- Etiology of Acute Hemorrhagic Pancreatitis, with Special Reference to Vascular Factors: Analysis of Autopsies and Experimental Investigation. C. J. Smyth, Ann Arbor, Mich.—p. 651.
- Component of Gallstones Insoluble in Ordinary Solvents and Accounting in Part for Their Dark Coloration. H. G. Aronson, Chicago.—p. 670.
- Changes in Cartilage and Bone of Immature Female Guinea Pigs Due to Undernourishment with Consideration of Processes of Repair Following Period of Refeeding. M. Silberberg and Ruth Silberberg, St. Louis.—p. 675.
- Wallerian Degeneration in Sciatic Nerve of Rat: Comparative Study with Silver, Osmic Acid and Chlorate Osmic Acid Methods. R. L. Swank, Boston.—p. 689.
- Influence of Sulfanilamide and Sulfapyridine on Experimental Pneumococcal Pneumonia in Rats. D. H. Goldstein and I. Graef, New York.—p. 701.
- Skin Color and Skin Cancer. J. Taussig and G. D. Williams, St. Louis.—p. 721.
- Studies in Experimental Lipoidoses: I. Phosphatides. A. Ferraro and G. A. Jervis, New York.—p. 731.
- Histology of Tumors of Peripheral Nerves. N. C. Foot, New York.—p. 772.

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16:553-604 (Sept.) 1940

- The Problem of Aging. G. M. Piersol, Philadelphia.—p. 555.
- Histaminase: Physiologic Effects on Man and Its Therapeutic Value in Medicine. Grace M. Roth and B. T. Horton, Rochester, Minn.—p. 570.
- Medical Management of Disorders of Biliary Tract. J. R. Twiss, New York.—p. 585.

Endocrinology, Los Angeles

27:345-532 (Sept.) 1940. Partial Index

- Comparison of Certain Effects of Desoxycorticosterone Acetate, Corticosterone and Cortical Extract on Patient with Addison's Disease. J. W. Ferrebee, C. Ragan, D. W. Atchley and R. F. Loeb, New York.—p. 360.
- *Suprarenal Cortical Hormone and Salt in Treatment of Pneumonia and Other Severe Infections. D. Perla and Jessie Marmorston, New York.—p. 367.
- Is the Potassium Tolerance Curve of Value in Diagnosis of Adrenal Cortical Insufficiency in Man? J. A. Greene, H. Levine and G. W. Johnston, Iowa City.—p. 375.
- Further Observations on Use of Adrenal Cortex Extract in the Psychotic and Nonpsychotic Patient. C. A. Loschner, Salem, Ore.—p. 378.
- Feminization and Demasculinization of a 17 Year Old Girl by Injections of Stilbestrol. H. Lissner, San Francisco.—p. 385.
- Further Experiences with Hormone of Pregnant Mare Serum. S. L. Siegler, Brooklyn.—p. 387.
- Treatment of Impotence by Male Sex Hormone. C. D. Creevy and C. E. Rea, Minneapolis.—p. 392.
- Sex Incidence of Peptic Ulcer in Children. H. C. Saltzstein, A. A. Farbman and D. J. Sandweiss, Detroit.—p. 400.
- Chorionic Gonadotropic Effects on Height and Osseous Development in Sexually Underdeveloped Young Boys. G. B. Dorff, Brooklyn.—p. 403.
- Suggestions for Conducting Growth Studies. E. H. Watson and R. C. Moehlig, Detroit.—p. 411.
- Effect of Fasting on Insulin Sensitivity. H. Selye, Montreal.—p. 434.
- Response of Testis to Small Doses of Testosterone Propionate. H. S. Rubinstein and A. A. Kurland, Baltimore.—p. 461.
- Effect of Atropine on Gastrointestinal Tract Following Thyroid Medication. S. Morrison and M. Feldman, Baltimore.—p. 500.
- Relation of Cervical Sympathetic Nerves to Activity of Thyroid. S. Brock, G. E. Doty, L. Krasno and A. C. Ivy, Chicago.—p. 504.

Adrenal Cortex Extract and Salt for Severe Infections.—Perla and Marmorston state that during the last two years adrenal cortex extract was used in the private practice of Marmorston in the treatment of seventeen cases of bronchopneumonia, one case of therapeutic malaria for dementia paralytica and six instances of severe grip. The general physiologic

care of severe infection was carried out for all these patients. In addition, adrenal cortex extract in amounts of from 2 to 5 cc. twice a day intramuscularly or subcutaneously was administered from the first day of observation and continued for two or three weeks until recovery. The apparent effects of the extract were as follows: 1. The normal blood pressure with prevention of collapse was maintained. 2. There was an evident decrease of toxicity. 3. Distention was avoided, the appetite improved and the sense of well being was increased. 4. There was an apparent shortening of the period of convalescence. In the cases with pneumonia, the signs in the chest did not clear up sooner than is usually anticipated. Sulfapyridine was given to three patients (two with pneumococcal infection and one with *Streptococcus viridans* pneumonia) but in two it was abandoned because of severe toxic symptoms (rash, rise in temperature and vomiting). The blood pressure of these patients was maintained though the psychic depressive effect of the sulfapyridine persisted. In several of the patients, periods of collapse were readily combated by the adrenal cortex extract, given intramuscularly in amounts of from 3 to 5 cc. every six hours night and day. The patient in whom malaria was induced went into profound collapse following the third chill. The blood pressure dropped to 60 systolic, 40 diastolic. Epinephrine had only a transient effect. Adrenal cortex extract was then administered for the first time, 5 cc. intravenously and maintained at the rate of from 3 to 5 cc. twice a day intramuscularly. The blood pressure rose promptly to 110/80 and was maintained. One hour after the first injection the patient sat up in bed, said he felt fine and asked for food. Similar experiences have been repeated in other cases. The diagnosis of the seventeen cases of bronchopneumonia was confirmed by x-ray examination. Only a single death occurred, that of a woman of 65 with a recent myocardial infarct complicated by bronchopneumonia. Two men and one woman more than 75 years of age made uneventful recoveries from bilateral bronchopneumonic processes. No complications occurred among the sixteen patients who recovered. The authors conclude that a quantitative evaluation of the extract as an adjunct in the treatment of severe infections is difficult. No definite chemical standard of its action on patients with intact adrenals who are given moderate doses of the extract is available. Nevertheless the clinical value is apparent and an extensive trial is indicated.

Illinois Medical Journal, Chicago

78:193-284 (Sept.) 1940

- Electrosurgical Obliteration of Gallbladder Without Drainage: Report of Results of 980 Cases with Mortality of 0.3 per Cent. M. Thorek, Chicago.—p. 211.
- Applications of Vitamin B₁ to Neuropsychiatry. F. G. Norbury, Jacksonville.—p. 238.
- Cholecystography: Special Reference to Diagnostic Value of Emptying Time. A. Hartung and J. Grossman, Chicago.—p. 233.
- Progressive Importance of Role of Practicing Physician in Tuberculosis Control. H. C. Sweany, Chicago.—p. 238.
- Cardiac Aneurysm: Evaluation of Its Clinical Features. W. A. Brams and A. Gropper, Chicago.—p. 246.
- Cardiac Review of 1939. N. Flaxman, Chicago.—p. 253.
- Progressive Medical Education. E. M. Stevenson, Bloomington.—p. 262.
- Laboratory Aids in Differential Diagnosis of Coma. L. Gerber, Peoria.—p. 263.
- Acute Gangrenous Appendicitis Associated with Embolic Occlusion of Coronary Artery: Case Report. J. D. Kirshbaum and L. Perlman, Chicago.—p. 267.
- Foreign Bodies in Vermiform Appendix: Report of Case. M. C. Ehrlich, Chicago.—p. 268.

Journal of Neurophysiology, Springfield, Ill.

3:373-466 (Sept.) 1940

- Activity in Simplest Spinal Reflex Pathways. B. Renshaw, New York.—p. 373.
- Influence of Sensory Systems on Spontaneous Activity of Cerebral Cortex. F. H. Lewis and G. D. Gammon, Philadelphia.—p. 388.
- Choline Esterase in Brain and Spinal Cord of Sheep Embryos. D. Nachmansohn, New Haven, Conn.—p. 396.
- Central Course of "Recurrent" Sensory Discharges. D. H. Barron, New Haven, Conn.—p. 403.
- Inter cortical Connections of Corpus Callosum as Indicated by Evoked Potentials. H. J. Curtis, Baltimore.—p. 407.
- Analysis of Cortical Potentials Mediated by Corpus Callosum. H. J. Curtis, Baltimore.—p. 414.
- Function of Mesencephalic Root of Fifth Cranial Nerve. K. B. Corlun and F. Harrison, Memphis, Tenn.—p. 423.
- Oculomotor Nerve and Reflex Dilatation of Pupil. W. D. Scybold and R. M. Moore, Galveston, Texas.—p. 436.
- Movements Elicited from Precentral Gyrus of Adult Chimpanzees by Stimulation with Sine Wave Currents. M. Hines, Baltimore.—p. 442.

Military Surgeon, Washington, D. C.**87:197-288 (Sept.) 1940**

- Federal Cancer Control Program. C. Voegtlin and R. R. Spencer.—p. 197.
 State of Medical Literature and Medical Libraries. H. W. Jones.—p. 207.
 Medical Control of Mobilization. H. Zinsser.—p. 214.
 Experimental Studies in Production of Agglutinins to *Bacillus Dysenteriae*. J. Felsen and Esther Levenkron.—p. 221.
 Colostomies, Their Care and New Type of Colostomy Bag. S. A. Rachlin.—p. 229.
 Therapy of Gas Gangrene. L. Cozen.—p. 231.
 Gastrocolic and Gastrojejunalic Fistulas: Report of Five Cases. J. R. Thomas.—p. 232.
 Hand Cart or Trailer for Movement of Medical Equipment. E. S. Linthicum.—p. 243.
 Gunshot Wounds of Face and Jaws: First Aid Treatment, Field Service. R. A. Stout.—p. 247.
 Practical Portable Light for the Otolaryngologist. S. Peluse.—p. 251.
 Malaria, 1940 Maneuvers, Luzon, Philippine Islands. H. B. McMurdo.—p. 252.
 The Dermatologist in the Military Organization. L. Goldman.—p. 256.
 Pedanius Dioscorides: Military Surgeon Under Nero. D. G. Friend.—p. 260.
 Dr. Thomas Archer: An Obstetric Landmark. J. M. Phalen.—p. 262.

Minnesota Medicine, St. Paul**23:609-680 (Sept.) 1940**

- Prevention and Treatment of Genital Prolapse. F. L. Adair, Chicago.—p. 609.
 *Local Use of Sulfathiazole in Treatment of Staphylococcal Infections: Preliminary Report. W. W. Spink and J. R. Paine, Minneapolis.—p. 615.
 Air-Borne Pollen in the Twin Cities Area with Reference to Hay Fever. C. O. Rosendahl, R. V. Ellis and O. A. Dahl, Minneapolis.—p. 619.
 *Management of Tetanus: Report of Use of Hyperthermia in One Case. P. H. Heersema, Rochester.—p. 636.
 Communicated Insanity: Instance of Folie à Cinq. T. L. L. Soniat and B. F. Smith, Rochester.—p. 641.
 Medical and Surgical Treatment of Prostatism. G. J. Thompson, Rochester.—p. 645.

Local Use of Sulfathiazole for Staphylococcal Infections.—Spink and Paine applied sulfathiazole directly to the staphylococcal lesions of sixteen patients. *Staphylococcus aureus* was isolated from every lesion. Depending on the site of the lesion, immobilization and elevation of the infected area were used to enhance circulation. Adequate surgical drainage and débridement of devitalized tissue were utilized. Sulfathiazole was applied directly to the lesions to permit a much higher local concentration of the drug than could be obtained when given orally. Acutely ill patients were also given sulfathiazole orally. This procedure was directed against a possible bacteremia and to prevent an extension of the primary focus. To prevent the inhibitory action of bacteria, exudate and necrotic tissue on sulfathiazole the wounds were irrigated frequently with warm saline solution and, following each irrigation, sulfathiazole was used in the wound in crystal form, 1 per cent aqueous solution or as wet packs. In a few cases, particularly those in which there were carbuncles, irrigations with hypochlorite solution aided considerably in removing purulent and sloughing material. The results were as follows: Of the four cases of carbuncle, three granulated in without cutaneous grafts and the results in the other one is doubtful; the six operative wound infections healed and became sterile; in one, decubitus ulcer grafts were successful after two previous attempts had failed, one corneal ulcer healed and became sterile, one of two chronic osteomyelitis lesions showed extensive osseous repair and the result in the other is too recent to draw any conclusion, the number of organisms was reduced in one pyopneumothorax but the cavity is not sterilized and there was improvement of the subcutaneous abscess but the patient died of leukemia.

Management of Tetanus.—Heersema reports the first case of tetanus in which hyperpyrexia was used in its management. In eight days the patient's condition had progressed to the point of acute continuous pain and inability to swallow, when hyperpyrexia was suggested by Woltman in the hope of increasing the neutralizing effect of the antitoxin. The patient was given four hours of artificial fever produced by physical means, with a systemic temperature ranging between 105 and 106 F. He tolerated the fever treatment very well after the first hour and it had the definite effect of relaxing his muscles. Because of the beneficial effect of relaxation he was placed in a pack at the end of the second fever session and allowed to

cool off over a period of four or five hours. This continued throughout twelve fever sessions. Each of the sessions was tolerated progressively better. They were given at intervals of approximately two days. When the patient was seen two and a half months after the nail wound which caused the tetanus, he reported complete recovery. The method must rest for the present on its merits as a means of symptomatic control of the painful spasms of tetanus which constitute, through exhaustion, the greatest problem and danger of this infection. Relief from the terrifying spasms, even at the cost of any discomfort from the hyperpyrexia, was welcomed by the patient and throughout the entire course he was able to be more cooperative on smaller amounts of hypnotics than is usually experienced. The more cooperative attitude of the patient is believed largely attributable to his relative freedom from fear and panic during the sessions of fever. The author believes that the symptomatic relief obtained is sufficient to warrant further trial of the method. The possible relationship of ascorbic acid and hyperpyrexia to tetanus toxin is suggested in that the fever may speed up an ascorbic acid reaction of detoxification of the tetanus infection.

Missouri State Medical Assn. Journal, St. Louis**37:369-408 (Sept.) 1940**

- Pain Relief in Labor. J. W. Harris and R. M. Waters, Madison, Wis.—p. 369.
 Intrathyroid Therapy for Hyperthyroidism: Secondary Report. F. M. Postlethwaite, Kansas City.—p. 372.
 Advances in Treatment of Cancer of Corpus Uteri. H. S. Crossen, St. Louis.—p. 376.
 Oxyuriasis and Appendicitis: Unusual Case. J. B. Carlisle and R. M. Carrel, Sedalia.—p. 386.
 Nonoperative Treatment of Head Injuries. D. F. Coburn, Kansas City.—p. 387.
 The Large Baby. W. D. Hawker, St. Louis.—p. 389.
 Evaluation of Kahn Test Procedure in St. Louis: Preliminary Report of Thirty-One Medical Institutions. N. Nagle and J. C. Willett, St. Louis.—p. 391.
 Spastic Colon. O. S. Jones, St. Louis.—p. 393.
 Prontosil in Pneumothorax. L. Schlenker, St. Louis.—p. 397.

New England Journal of Medicine, Boston**223:353-390 (Sept. 5) 1940**

- Experimental Human Scurvy. J. H. Crandon, C. C. Lund and D. B. Dill, Boston.—p. 353.
 Alpha and Beta Neutral Ketosteroids (Androgens): Preliminary Observations on Their Normal Urinary Excretion and Clinical Usefulness of Their Assay in Differential Diagnosis. N. B. Talbot, A. M. Butler and Elsie A. MacLachlan, Boston.—p. 369.
 Reliability of Leukocyte Count in Diagnosis of Appendicitis. A. S. Johnson, Springfield, Mass.—p. 373.
 Clinical Neurology. J. B. Ayer, Boston.—p. 376.

223:391-438 (Sept. 12) 1940

- Care of the Back Following Spinal Cord Injuries: Consideration of Bedsores. D. Munro, Boston.—p. 391.
 *Tuberculosilicosis. L. Benson, Pittsford, Vermont.—p. 398.
 *Hypotension: The Ideal Normal Blood Pressure. S. C. Robinsen, Chicago.—p. 407.
 Symptom of One-Sided Affection of Lungs and of Mediastinum. L. Hess, Brookline, Mass.—p. 417.
 Pediatrics. R. C. Eley, Boston.—p. 418.

Tuberculosilicosis.—Benson reports observations on 207 employees in the granite industry who had silicosis complicated by pulmonary tuberculosis. These observations point to free silica as the substance which increases the liability to tuberculous infection. The silica is believed to act as a chemical irritant of pulmonary tissue. Evidence points to a decrease in tissue resistance to tubercle bacilli in cases of silicosis. The diagnosis of tuberculosilicosis requires the existence of a silicosis hazard. The occupational history must show the presence of dangerous concentrations of free silica in the breathing air level. This danger limit in the granite industry is usually set at 10,000,000 particles per cubic foot of air. Average dust counts in the granite-cutting trade have ranged from approximately 60,000,000 particles per cubic foot of air for hand pneumatic tool operators to less than 10,000,000 for attendant laborers. Another contribution toward the diagnosis of tuberculosilicosis is the detection of a high local rate of pulmonary tuberculosis in an industry and its environment. The onset of tuberculous infection in silicotic patients may be accompanied by no symptoms, by a general indisposition or by an explosive widespread dissemination of the disease process. The com-

monest symptom is dyspnea. The patient becomes conscious of a breathing effort that he had not noticed previously. Cough, expectoration, chest pain and hemoptysis often accompany the onset of tuberculous infection in silicosis. In the roentgenologic picture of tuberculosis the linear apical shadows that may be present seem to be broader than those noted in cases of pulmonary tuberculosis without silicosis. Unless these are in the top lung fields, tuberculosis with silicosis is difficult to differentiate from conglomerate silicosis. The only absolute clinical proof of tuberculosis is the discovery of tubercle bacilli in the sputum. There appears to be high correlation between the x-ray evidence of cavities in tuberculosilicosis and tubercle bacilli in the sputum. The commonest clinical form of tuberculosilicosis seen in granite workers is that in which there is a slow progression of the infectious process. Many of these cases suggest that silicosis is superimposed on inactive tuberculosis. The chronic course seems to follow the reactivation of the old lesions and begins chiefly in the upper lobes and extends to the lower fields. The consolidation increases yearly, and basal infiltration is quite common. There are cough, dyspnea, distorted thorax and later purulent expectoration. The patients are usually afebrile but have toxic symptoms off and on. The sputum is ordinarily negative until the terminal months but may be positive intermittently. Preemployment examinations to detect respiratory disease before the worker can be exposed to silica dust are of value in the prophylaxis of tuberculosilicosis. The treatment of tuberculosilicosis is the same as that of pulmonary tuberculosis.

Hypotension: The Ideal Normal Blood Pressure.—According to Robinson, hypotension has been looked on as a disease entity. The "low blood pressure" person was described as one who lacked stamina, tired easily, complained of cold extremities and showed an inability to do prolonged mental or physical work. The author is not concerned with such diseases as Addison's disease, coronary thrombosis, status lymphaticus, shock or infectious diseases which may be accompanied by low blood pressure. The dividing line between normal and hypotensive pressure has never been unanimously agreed on. The upper limit of systolic hypotension has been put as high as 120 mm. and as low as 90 mm. Because the 110 mm. level is chosen by about half the observers, the author has selected it as the point below which all pressures are tentatively called hypotensive. He does not imply that this level makes any significant division in the realm of blood pressure. The level of diastolic pressure below which hypotension is said to exist is not so frequently suggested. Because the 70 mm. diastolic level corresponds statistically to the 110 mm. systolic level, it has been selected for the purpose of this report as the upper level of diastolic hypotension. Hypotension is not a rare occurrence. In a series of 10,883 persons representative of an urban group the age standardized incidence of systolic pressures under 110 mm. was 25 per cent and that of diastolic hypotension 34 per cent. Robinson finds that age has a negligible effect on the distribution of low systolic blood pressure in men up to the seventh decade; thereafter the incidence decreases. Young women have a much higher incidence of low blood pressure than do men, and old women have about the same incidence as do old men. Hypotension is commonest among the linear built or narrow chested type. It is two or three times commoner among lightweight than among heavy-weight men and women. Low blood pressures show a smaller and less erratic yearly variation and do not vary over as great a range as do high pressures. They do not tend to rise with age; rather they maintain an even level. They are associated with a mortality rate lower than that of average pressures. The symptoms usually ascribed to hypotension are in reality commoner among hypertensive persons. There are no symptoms peculiar to or due to low blood pressure. Neither fatigue nor vitality is a function of the level of blood pressure; rather they are related to the daily physical activity of the individual. In fact, those persons noted for endurance, vitality and well-being, trained athletes, farmers and other active groups, are also noted for their high incidence of low blood pressure. Hypotension is not a disease; it is an ideal blood pressure level.

New York State Journal of Medicine, New York

40:1275-1346 (Sept. 1) 1940

- Fractures Into and Around Knee Joint. C. M. Allaben, Binghamton.—p. 1279.
Fractures Involving Shoulder Joint. E. T. Wentworth, Rochester.—p. 1282.
Fractures of Elbow. R. S. Farr, Syracuse.—p. 1288.
Fractures of Ankle. B. E. Obletz, Buffalo.—p. 1291.
*Comparison of Belladonna and Other Forms of Medication in Treatment of Chronic Encephalitis. Josephine B. Neal and S. M. Dillenberg, New York.—p. 1300.
Bacillary Dysentery Due to *Bacillus Alkalescens*. J. Felsen and W. Wolarsky, New York.—p. 1303.
Staphylococcus Aureus Septicemia. O. W. H. Mitchell and O. D. Chapman, Syracuse.—p. 1308.
*Picrotoxin Treatment of Barbiturate Poisoning. E. C. Reifenstein Jr., Syracuse.—p. 1312.
Electrically Induced Convulsions in Treatment of Mental Diseases. R. Almansi and D. J. Impastato, New York.—p. 1315.
Certified Milk—Yesterday and Tomorrow. S. A. Cohen, New York.—p. 1317.

Bulgarian Belladonna and Other Medication in Chronic Encephalitis.—According to Neal and Dillenberg, the Matheson Commission for encephalitis research began about two years ago the use of white wine decoction of Bulgarian belladonna in treating patients with chronic encephalitis. When it was found that this decoction deteriorated on standing, a tablet was prepared to insure a stable preparation. Approximately 100 patients have been treated with these preparations and with the tablets. Practically all of these patients had previously tried other forms of symptomatic treatment, such as scopolamine, stramonium, amphetamine sulfate or combinations of these medications. The results with the Bulgarian belladonna were far superior to those obtained with any other form of symptomatic treatment. About one third can be considered greatly improved, one half moderately improved and the remainder slightly improved. Many of the patients have been under treatment for at least a year and a half, and the improvement has been maintained. In certain cases the improvement is increasing. It was possible to make a comparative study between twenty-three patients treated with tablets of Bulgarian belladonna and twenty-one treated with a synthetic preparation containing about 0.5 mg. of alkaloids in the following combination: hyoscyamine 0.45 mg., atropine 0.037 mg. and scopolamine 0.012 mg. All patients were in a far advanced stage of chronic encephalitis and all had previously received various forms of medication. The severity of encephalitis was as nearly equal as possible in the two groups. The results obtained with the tablets of Bulgarian belladonna were far superior to those with the synthetic preparation. All except three of them showed subjective improvement. They felt stronger, slept better, had less feeling of tension and were more cheerful and cooperative. Objectively there was an improved facial expression, less spasticity and tremor, greater facility in motion, and improvement in speech. Increased salivation was entirely relieved in practically all cases. The improvement of the patients treated with the synthetic preparation was similar but not so marked. The synthetic preparation produced toxic effects more frequently, more severely and with smaller doses than did the Bulgarian belladonna. It is interesting that, when the comparative study was ended and the patients were returned to the previous medication, almost all of those treated with tablets of Bulgarian belladonna requested that these tablets be continued, whereas the patients who had received the synthetic preparation for the most part accepted the return to the former medication without comment. The authors conclude that Bulgarian belladonna is the most beneficial drug available in the treatment of chronic encephalitis.

Picrotoxin Treatment of Barbiturate Poisoning.—Reifenstein calls attention to a previous publication in which he described two cases of barbiturate poisoning treated with picrotoxin and presents a third case in which recovery from a lethal dose of phenobarbital occurred with no antidotal treatment except picrotoxin. The patient was given one of the largest reported doses of picrotoxin (559 mg.) without harmful effect and he failed to exhibit the depressed blood pressure usually observed in acute barbiturate poisoning. He was 25 years of age, weighed 146 pounds (66 Kg.) and had taken from 6 to 8 Gm. of phenobarbital with suicidal intent. He remained untreated for fourteen hours and was found in a deep coma. He

failed to respond to physical stimulation. He was treated continuously for seventy-eight hours with intravenous injection of picrotoxin, alternating with intravenous administration of sucrose. He received a total of 559 mg. of picrotoxin and 1,250 cc. of a 50 per cent solution of sucrose. This case furnished additional evidence that picrotoxin is an effective antidote of acute barbiturate poisoning.

Philippine Medical Association Journal, Manila

20:395-440 (July) 1940

- Hypoglycemic Effect of Decoction of Lagerstroemia Speciosa Leaves (Banaba) Administered Orally. F. Garcia, Manila.—p. 395.
Ligation of Internal Iliac Arteries (Hypogastric Arteries) in Prostatic Hypertrophy. C. D. Franco and P. T. Nery, Manila.—p. 403.
Studies on Vitamin C: VII. Blood Ascorbic Acid Content in Pregnancy and Lactation. Solita F. Camara and I. Concepcion, Manila.—p. 407.
How Safe and Effective Is Spinal Anesthesia? B. R. Diño and S. C. Meñez, Manila.—p. 411.

Public Health Reports, Washington, D. C.

55:1517-1554 (Aug. 23) 1940

- *Disabling Morbidity and Mortality from Cancer Among Male Employees of Oil Refining Company, with Reference to Age, Site and Duration, 1933-1938, Inclusive. W. M. Gafafer and Rosedith Sitgreaves.—p. 1517.
Experimental Transmission of Trypanosoma Cruzi Infection in Animals by Triatoma Sanguisuga Ambigua. A. Packchianian.—p. 1526.

55:1555-1598 (Aug. 30) 1940

- Diagnosis Code for Use in Tabulating Morbidity Statistics. T. Parran and W. L. Austin.—p. 1558.
Distribution of Selenium in Plasma and Liver Proteins and Its Fractionation in Tryptic Liver Digests. B. B. Westfall and M. I. Smith.—p. 1575.

55:1599-1646 (Sept. 6) 1940

- Rheumatic Heart Disease in Philadelphia Hospitals: Study of 4,653 Cases of Rheumatic Heart Disease, Rheumatic Fever, Sydenham's Chorea and Subacute Bacterial Endocarditis Involving 5,921 Admissions to Philadelphia Hospitals, from Jan. 1, 1930, to Dec. 31, 1934. O. F. Hedley.—p. 1599.
Factors Influencing Efficacy of Phenolized Rabies Vaccines: I. Strains of Fixed Virus. K. Habel.—p. 1619.
Care of the Feet.—p. 1631.

55:1647-1706 (Sept. 13) 1940

- Rheumatic Heart Disease in Philadelphia Hospitals: Study of 4,653 Cases of Rheumatic Heart Disease, Rheumatic Fever, Sydenham's Chorea and Subacute Bacterial Endocarditis, Involving 5,921 Admissions to Philadelphia Hospitals from Jan. 1, 1930, to Dec. 31, 1934: II. Age, Race and Sex Distribution and Interrelation of Rheumatic Fever, Sydenham's Chorea, Rheumatic Heart Disease and Subacute Bacterial Endocarditis. O. F. Hedley.—p. 1647.

Cancer Among Male Employees of Oil Refining Company.—Gafafer and Sitgreaves studied the records of the members of a sick benefit plan connected with an oil refining company. The study covers a period of six years, from 1933 to 1938, during which there was approximately 60,000 years of membership for the male employees. There were seventy cases of cancer, forty-six of which ended in death. The cases which did not end in death terminated in recovery or insufficient improvement for return to work. The forty-six deaths yield an average annual death rate of 0.78 per thousand. The population exposed represents an age distribution ranging approximately from 15 to 69 years. The calculated crude death rate from cancer for white males from 15 to 69 years of age throughout the entire United States for the years 1933 to 1937 is 0.96 per thousand, while the experience of the industrial department of a large life insurance company for 1935 gives a rate of 0.86. Although previous studies have indicated that certain types of mineral oils possess carcinogenic activity, the present experience is therefore not unfavorable. Relatively more cancers of the digestive system occurred among the employees studied (thirty-two, or 69.6 per cent of the deaths) than occurs among the total population. The proportion of cancers of the genitourinary system was somewhat less, 8.7 per cent as compared to 15 per cent. There were five cancers of the respiratory system, three of the buccal cavity and two of other sites. Study of the duration of disability of all cases reveals that among the thirteen cases of cancer of the oral region seven caused disability of less than twenty-eight days and that none of these were fatal. One death was recorded among three cases lasting from twenty-nine to ninety-one days, and the two patients whose disability lasted longer than 182 days died. A corresponding

relationship is observed for cancer of the trunk and extremities. However, the reverse is true for cancer of the lung. The five deaths among the eight cases recorded for this site all occurred during the interval of from twenty-nine to 182 days. If the average durations of the fatal and of the nonfatal cases are arranged in order of decreasing magnitude by specific site, the two arrays show that the lungs come first in the array of nonfatal cases with an average case duration of 359.3 days. This site is last in the array of fatal cases with an average case duration of 90.6 days. The reverse holds for cancer of the trunk and extremities and of the oral region. These are first and second in the arrangement of fatal cases with average durations of 263 and 249 days respectively and at the bottom of the array of nonfatal cases, with average durations of seventy and 363 days.

Southern Medical Journal, Birmingham, Ala.

33:911-1014 (Sept.) 1940. Partial Index

- Sulfathiazole in Treatment of Gonorrhea: Preliminary Report. E. G. Ballenger, II. P. McDonald and R. C. Coleman Jr., Atlanta, Ga.—p. 911.
*Studies on Epidemiology of Oxyuriasis. W. Sawitz, J. S. D'Antoni, K. Rhude and S. Loh, New Orleans.—p. 913.
*Incidence of Pinworm (Enterobius Vermicularis) Infection in North Carolina. H. W. Brown, A. J. Sheldon and T. Thurston, Chapel Hill, N. C.—p. 922.
Local Protection or Immunity with Evidences of Experimental Application. W. H. Harris and Shirley Walthers, New Orleans.—p. 925.
Study of Incidence of Air-Borne Molds and of Skin Sensitivity to Molds. Edna S. Pennington, Nashville, Tenn.—p. 931.
Use of Pontocaine in Spinal Anesthesia: Report Based on 1,710 Consecutive Cases. E. B. Robinson Jr., Fairfield, Ala.—p. 955.
Prophylactic Use of Tetanus Antitoxin: Analysis of 500 Cases. C. E. Newell, Chattanooga, Tenn., and C. McVea, Baton Rouge, La.—p. 962.
Transfusion in Infants. J. E. Burch, Miami, Fla.—p. 972.
Role of Vitamin K in Etiology, Prevention and Treatment of Hypoprothrombinemia and Hemorrhagic Diathesis of the Newborn. W. W. Waddell Jr., D. Guerry 3d and M. Birdsong, University, Va.—p. 974.
Vaginal Discharge During Pregnancy. A. P. Hudgins, Charleston, W. Va.—p. 979.
Radiation Therapy as Aid in Diagnosis and Treatment of Certain Abdominal Tumors. E. A. Merritt and R. M. Caulk, Washington, D. C.—p. 989.
Doubt: A Healthy State of Mind. W. W. Young, Atlanta, Ga.—p. 991.
Physical Requirements for Entrance and Supervision of the Health and Welfare of Students During the Medical Course. H. D. Moor, Oklahoma City.—p. 995.
The Hospital's Responsibility for Training of Interns and Residents. F. R. Bradley, St. Louis.—p. 1000.
Publicity's Place in the Public Health Program. J. M. Gibson, Montgomery, Ala.—p. 1003.

Epidemiology of Oxyuriasis.—Sawitz and his associates examined 491 inmates of six children's homes for Enterobius vermicularis. The National Institute of Health swabs were used for examinations. The total incidence of infection was 74.3 per cent; the highest in one home being 96.9 per cent, and the lowest in another was 15.9 per cent. The incidence among the 278 white boys was 89.6 per cent, among the eighty-seven white girls 60.9 per cent, among the sixty-three Negro boys 84.1 per cent and among the sixty-three Negro girls it was 15.9 per cent. The incidence by age showed an increase during the first six years of life. It remained high until the fourteenth year and then decreased. The incidence by age and sex showed a slightly lower incidence in girls than in boys under comparable environmental conditions in the first six years of life, an equally high incidence up to nine years and then the incidence decreased among girls but remained high among boys until the age of 15 or more. The incidence by age and race showed no difference if groups of the same age and sex and under the same environmental conditions were compared. Among children of comparable age it was more than twice as high among those in large dormitories as among those in single or double rooms. Enterobius eggs were recovered from pajama pants, bed sheets and ledges of pillars, windows and doors of dormitories and toilet rooms. The usual hygienic measures such as frequent house cleaning, change of underwear and bed sheets and frequent bathing did not interrupt the important transmission routes of Enterobius. A cleanliness period of six weeks in one home did not result in any decrease in the infection. The Enterobius incidence among children biting their fingernails was no greater than among others. No correlation was found between Enterobius incidence and the amount of money spent for the maintenance of

the institution or for the food of the children. The important transmission route of *Enterobius vermicularis* appears to be by direct contact with infected individuals or contaminated objects. The incidence by age is tentatively explained as follows: Infection in the first year of life is exceptional because babies usually remain in separate beds and have no prolonged contact with other children. From 1 through 5 years of age the incidence increases with age, but the children are washed and taken care of. From 6 years on the incidence runs highest as the children come in close contact with one another during school or play, and although they wash themselves they do not do so effectively. The incidence continues to be high unless separate bedrooms or rigid personal cleanliness control the infection. These factors become operative earlier in the lives of girls than of boys.

Pinworm Infection in North Carolina.—Brown and his colleagues endeavored to determine the prevalence of pinworm infection in North Carolina by examining the following groups of individuals: (1) 132 white boys from 8 to 14 years of age from the Charlotte Observer Fresh Air Camp, (2) 100 white and Negro patients of all ages at the Duke University Hospital outpatient clinic who were not seeking aid due to symptoms referable to pinworms and (3) 118 male students aged from 17 to 31 years attending the University of North Carolina. All specimens were obtained by means of the National Institute of Health swab. Single swab examinations made on the 132 white boys revealed a pinworm infection rate of 32.8 per cent. Considerable variation was encountered; for example, 25 per cent of the 10 year old boys were found to be infected, while the 13 year old boys showed a rate of 50 per cent. Of the 100 patients sixty-seven were white and thirty-three were Negroes. Both children and adults were included in the group which was definitely of the lower income group. A total of 7.4 per cent of the white patients were infected. However, a rate of 16.6 per cent was revealed among the white patients between 0 and 19 years of age, while only 2.3 per cent of those 20 years or older were infected. Not a single pinworm infection was found among the thirty-three Negroes examined and likewise none among the university students, although special care was taken in their examination. Additional epidemiologic investigations are needed to show why pinworm infection was not found among the Negro outpatients. It is possible that the Negro may be partially immune to pinworm infection as he is to hookworm infection.

Western J. Surg., Obst. & Gynecology, Portland, Ore. 48:537-590 (Sept.) 1940

- The Most Important Professional Disease—Coronary Sclerosis. T. Leary, Boston.—p. 537.
Culture of Human Marrow: Summary of Studies to Date. E. E. Osgood, Portland, Ore.—p. 540.
Anatomic Classification of Goiter. W. C. MacCarty, Rochester, Minn.—p. 550.
Warthin's Diathesis in Acute Toxic Goiter. J. K. McGregor, Hamilton, Ont.—p. 556.
Cardiospasm: Report of Case and Discussion of Improper Treatment. W. B. Faulkner Jr., San Francisco.—p. 561.
*Treatment of Massive Hemorrhage from Peptic Ulcer. C. S. Stone Jr., Seattle.—p. 564.
Gastric and Duodenal Ulcer: Simplified Technic for Gastric Resection. D. E. Ross, Los Angeles.—p. 571.
Pilonidal Sinus. C. M. Burgess, Honolulu, Territory of Hawaii.—p. 581.
Perineural Fibrosarcoma of Left Vagus Sheath: Report of Case. E. D. Furrer and I. R. Fox, Eugene, Ore.—p. 584.

Treatment of Massive Hemorrhage from Peptic Ulcer.—Stone reviews the twenty year experience of the Mason Clinic with massive hemorrhage from peptic ulcer. A total of fifty-seven such cases among the 1,076 examined for peptic ulcer were so designated because they were sufficiently severe to produce hematemesis or melena, fall in blood pressure, pallor and perhaps syncope. There were nine deaths, a mortality of 15 per cent and an incidence of seven massive hemorrhages and one death from hemorrhage for each 10,000 admissions to the clinic. This explains why death from massive hemorrhage has been considered rare in a practice limited to private patients. Thirty-five of the patients were less than 50 years of age and three of these died, one of hemorrhage from a jejunal ulcer and two from unrelated causes after the cessation of bleeding but while the patients were still in the hospital. Six of the

remaining twenty-two patients who were more than 50 years of age died, giving a mortality of 27 per cent for this age group. All these patients died of exsanguination, two following late surgery. The author is in accord with the many internists and surgeons who now believe that early surgical intervention is indicated in these older patients. However, the true value of early surgical intervention will not become apparent until comparative figures are available for this age group. There are certain limitations beyond which surgery cannot go. Some patients in this group will die of hemorrhage before surgical intervention is possible. Many of the patients in this older group will be very poor surgical risks at best, and their chance of surviving radical surgery will be less than the probable two in three chances of surviving a profuse hemorrhage. Surgical judgment must play a great part in selecting them for emergency operation as well as in the choice of the operative procedure. The surgeon must be willing to accept a high risk if he hopes to reduce a mortality of 30 per cent. Technical difficulties will at times prevent satisfactory and permanent control of hemorrhage. The almost always fatal result among patients seen after prolonged hemorrhage justifies an attempt to control the hemorrhage by some direct surgical procedure. Recent advances in the care of depleted patients and in the prevention of complications may improve the results of late surgical intervention in the course of bleeding. The approximate mortality of 30 per cent among patients more than 50 years of age indicates the seriousness of massive hemorrhage from peptic ulcer and is a definite challenge to those who advocate conservative treatment for these patients. The infrequency of cases of massive hemorrhage from peptic ulcer in private practice suggests that an approach to this problem must be based largely on the combined reports from other sources. Recurrent profuse hemorrhage demands surgical intervention.

Wisconsin Medical Journal, Madison

39:701-796 (Sept.) 1940

- Sex Hormones. A. A. Werner, St. Louis.—p. 717.
Cholecystostomy versus Cholecystectomy and Instrumental Dilatation of Papilla of Vater. A. L. Mayfield, Kenosha.—p. 724.
Management of Carcinoma of Cervix. A. H. Curtis, Chicago.—p. 728.
Severe Hyperemesis Gravidarum with Avitaminosis: Report of Two Cases. C. J. Lund, Madison.—p. 731.
*Karaya and Related Gums as Causes of Atopy. S. M. Feinberg, Chicago, and B. B. Schoenkerman, Milwaukee.—p. 734.

Karaya and Related Gums as Causes of Atopy.—Feinberg and Schoenkerman encountered ten patients whose allergic symptoms were attributable to karaya and related gums. The ten patients were women; the source of exposure of eight of them was the hair-setting fluid or powder used in their hair; one was a hair dresser and the source of contact of the other one was the women visiting her shop after having their hair dressed in a nearby establishment. Of these ten patients, eight were tested with acacia; only one gave a slight positive reaction. Nine were tested with tragacanth; two showed slightly positive reactions. In four karaya gum was the sole cause of the allergic symptoms; in the others, additional causes played a part, particularly pollen and fungi. The allergic symptoms of three of these women were entirely those of rhinitis; asthma was the predominant symptom of six, although rhinitis was also present in some of the latter. One of the women with asthma also had a dermatitis of the face and scalp which was attributable to the gum. The sole complaint of one woman was a dermatitis of the face and neck. Although the dermatitis was caused by contact it was of the atopic variety, as indicated by the presence of the positive scratch test and of circulating reagins. Eight women obtained a complete cure or subsidence of symptoms due to this allergen by substitution of other ingredients in the preparations employed for the hair. Desensitization, with only partial results, was employed for one, and lack of cooperation and the presence of complicating allergy in the remaining patient resulted in failure. The authors state that, because of the wide use of these materials in cosmetics, numerous foods, pastes, constipation remedies and many other products many more instances of this type of allergy will undoubtedly be found. The possibility of other water soluble gums in industry as a source of allergy must not be overlooked.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2:245-274 (Aug. 24) 1940

- *Pulmonary Tuberculosis in Recruits: Experiences in a Survey by Micro-radiographic Method. E. L. Cooper.—p. 245.
 *Serum and Plasma in Treatment of Hemorrhage in Experimental Animals. J. W. Magladery, D. Y. Solandt and C. H. Best.—p. 248.
 Experience in Treatment of War Burns. S. M. Cohen.—p. 251.
 Abdominal Actinomycosis Treated with Sulfapyridine. W. H. Ogilvie.—p. 254.
 Effect of Explosion Blast on Lungs: Report of Case. S. T. Falla.—p. 255.
 Probable Effect of Therapeutic Injection of Serum on Agglutination Tests for Leptospiral Infection. J. M. Alston.—p. 256.

Pulmonary Tuberculosis in Recruits.—According to Cooper, the discovery of cadets with active pulmonary tuberculosis induced the medical directorate at the Australian army headquarters to consider the possibilities of a mass survey of recruits. He points out that the microroentgenographic method developed chiefly by Manuel de Abreu in Rio de Janeiro is especially valuable for mass examinations. In an appendix he describes the equipment used for the miniature x-ray examination and in another one the procedure employed for the miniature roentgenography of the chests of recruits. Every small film (35 mm.) is examined by at least one physician and one radiologist. Usually more than two medical men are present during the viewing of films. Whenever anything abnormal is detected in the 35 mm. film a large roentgenogram is taken next day. No man is rejected on the small film alone. The 14 by 17 inch film is reported on by a physician and a radiologist, and the large film, with the report, is made available to a medical board consisting of two physicians. No man is discharged from the Forces on x-ray observations alone: in every instance in which x-ray examination suggests tuberculosis a case history is recorded and the chest is reexamined by two physicians. If any sputum can be obtained it is examined for tubercle bacilli by staining and culture. About 9,000 recruits were examined personally by the author and this report deals with the conclusions drawn from these 9,000 films. It takes some time to become accustomed to reading the small films. Both the intensity of illumination and the character of the surface on which the films are projected make an appreciable difference. Each radiologist has an optimal distance from the projection screen at which the image appears most like the large chest films to which he is accustomed. Some abnormalities are detected more easily at a distance of from 8 to 10 feet, but for routine reporting a distance of 6 feet suits most. The small films can be projected up to a size of approximately 12 by 14 inches without loss of detail. Enlargement to the 14 by 17 inch size is not always possible. The maximum number of 35 mm. films reported by a group was about 1,000 in an evening of three hours. As fatigue occurs rapidly the practice was adopted of one radiologist reporting on not more than from seventy to 100 successive chests without relief by one of the others present. A comparison between the 35 mm. pictures and the 14 by 17 inch film demonstrates that there are factors operating in the micro-roentgenographic technic which result in variations from what is generally regarded as a normal chest roentgenogram. In 541, or 6 per cent, of the 9,000 recruits 14 by 17 inch films were ordered. Four thousand eight hundred and thirty (54 per cent) of the microroentgenograms showed evidence of hilar calcification suggestive of a healed primary tuberculous infection; 120 (1.33 per cent) showed evidence in the lung fields of past or present tuberculous infection of the secondary adult type of tuberculosis; forty-nine recruits (0.55 per cent) showed evidence of active pulmonary tuberculosis. In addition to the cases of pulmonary tuberculosis, other lesions were detected such as a large cyst, two mediastinal neoplasms, several aneurysms of the aorta, congenital polycystic disease and nontuberculous pneumonitis.

Serum and Plasma in Treatment of Hemorrhage.—The stability of serum or plasma and the growing body of evidence that pooled samples can be safely used in human patients of any blood type prompted Magladery and his collaborators to

reinvestigate the extent to which these fluids can replace whole blood in the treatment of animals with acute hemorrhage. The study deals with results obtained in fifty-five dogs of from 5 to 15 Kg. in weight. Anesthesia was produced and the animals were prepared in the usual way for the recording of blood pressure and the administration of fluids. After the blood pressure had reached a reasonably steady level and control blood samples had been obtained, bleeding was begun through an arterial cannula at a rate which produced a gradual reduction of the pressure to about 30 mm. of mercury. It soon became apparent that neither the weight of the animal nor its initial blood pressure afforded any precise indication of the quantity of blood which had to be removed before typical post-hemorrhagic shock appeared. When enough blood was removed this condition usually developed. It was characterized by a low body temperature and a failure of the blood pressure to rise above the level of from 30 to 50 mm. of mercury after cessation of bleeding. When death was imminent, treatment consisting of application of heat and the intravenous injection of serum or plasma was instituted. Determinations of blood volumes were made by the dye method of Gibson and Evans as adapted to the photoelectric colorimeter (Gibson and Evelyn, 1938), but after many control experiments it became apparent that samples taken more than thirty minutes after the injection of the dye (T 1824) gave unreliable results when the animal was in posthemorrhagic shock. For this reason satisfactory blood volume determinations were secured in only eleven experiments. Cell volumes were determined by the hematocrit. In untreated hemorrhage no animal losing more than 55 per cent of its calculated blood volume recovered without some form of treatment. An attempt was made to compare the efficacy of various blood substitutes. Isotonic saline, hypertonic saline and dextrose solutions were tested. Even when administered in large quantities these solutions produced rises in blood pressure which were so evanescent that they were considered to have relatively little value as blood substitutes. In animals which were treated with their own heparinized blood, it was found that about 40 per cent of the removed blood had to be replaced to secure recovery of an animal in posthemorrhagic shock. Comparable volumes of serum or plasma produce equally satisfactory results. Thus the observations indicate that the volume of the red cells restored to the animal is more important than their oxygen-carrying capacity and that serum and plasma, which can be stored for long periods, are effective blood substitutes for the treatment of hemorrhage. The authors also observed the importance of administering blood or blood substitutes at a rapid rate (from 50 to 100 cc. a minute) and as soon as possible after the hemorrhage.

Journal of Neurology and Psychiatry, London

3:197-292 (July) 1940

- Topographic Studies of Disturbances of Sweat Secretion After Complete Lesions of Peripheral Nerves. L. Guttman.—p. 197.
 Alzheimer's Disease: Report of Six Cases. W. H. McMenemey.—p. 211.
 Basilar Impression of Skull. A. de Vet.—p. 241.
 Study on Pure Word Deafness. R. E. Hemphill and E. Stengel.—p. 251.
 Neuronal Differentiation in Implanted Fetal Cortical Tissue. W. E. le Gros Clark.—p. 263.

Lancet, London

2:219-252 (Aug. 24) 1940

- Experimental Study of Blast Injuries to Lungs. S. Zuckerman.—p. 219.
 *Effects of High Explosive Blast on Lungs. D. M. Dean, A. R. Thomas and R. S. Allison.—p. 224.
 *Penicillin as Chemotherapeutic Agent. E. Chain, H. W. Florey, A. D. Gardner, N. G. Heatley, M. A. Jennings, J. Orr-Ewing and A. G. Sanders.—p. 226.
 Meningococcal Meningitis Starting as Diabetic Coma. C. W. Ward and A. A. Driver.—p. 228.
 Looking Wrist. L. S. Michaelis.—p. 229.
 Effect of Venesection on Capacity of Lungs. E. M. Glaser and J. McMichael.—p. 230.

Effects of High Explosive Blast on Lungs.—Dean and his collaborators present a series of twenty-seven cases in which treatment was being given for burns or otitis resulting from the bursting of high explosive quarters. Special attention was given to the state of the lungs. In two cases the question of exposure to blast

Only six patients complained of symptoms related to the chest; sixteen showed some abnormal physical signs and fourteen showed abnormal radiologic appearances. Evidence of serious pathologic changes in the chest was absent in all but two cases; in one of these the signs of collapse of a lobe of the lung were present, in the other the signs of a patchy consolidation of the bronchopneumonic type. The relative importance of the three factors to which the patients were exposed—blast, burns and immersion—in relation to the chest conditions is impossible to assess. It will be difficult to find cases in which there are no external injuries. Immersion may have played an important part in one case but this experience occurred in only three and the other two showed neither symptoms nor signs of chest involvement. The authors emphasize the relative disproportion in frequency between the symptoms and physical signs in the cases studied. This may be due to the fact that all were subject of serious injuries which would tend to direct their attention away from the chest. Since chest complications may arise after explosion blast without definite warning symptoms, routine examinations should be performed even in those who are apparently unaffected by the blast. The physical signs that may be expected are diminished movement of the diaphragm, fullness of the chest giving it an emphysematous appearance, and impairment of resonance at one or both bases, with or without crepitations. The frequency of a "blown up" or ballooned appearance of the chest, especially at the lower costal margins after such injuries, may be related to the posture the patients adopted in bed or to the presence of an already existing emphysema, though this seems unlikely since they were all young men and in good health before being injured. This appearance was often associated with diminished movement of the diaphragm. It may be that some true traumatic emphysema results in these cases.

Penicillin as Chemotherapeutic Agent.—Chain and his associates point out that although in recent years interest in chemotherapeutic effects has been almost exclusively focused on the sulfanilamides and their derivatives there are other possibilities, notably those connected with naturally occurring substances. Following studies on lysozyme, it occurred to the authors that it would be profitable to investigate the chemical and biologic properties of the antibacterial substances produced by bacteria and molds. They began their studies with a substance produced by a mold in which Fleming in 1929 had observed antibacterial properties. Fleming noted that a mold produced a substance which inhibited the growth of staphylococci, streptococci, gonococci, meningococci and *Corynebacterium diphtheriae* but not of *Bacillus coli*, *Haemophilus influenzae*, *Salmonella typhi*, *Pseudomonas pyocyanea*, *Bacillus proteus* or *Vibrio cholerae*. He suggested its use as an inhibitor in the isolation of certain types of bacteria, especially *Haemophilus influenzae*. He also noted that the injection into animals of broth containing the substance, which he called "penicillin," was no more toxic than plain broth, and he suggested that the substance might be a useful antiseptic. The mold is believed to be closely related to *Penicillium notatum*. Methods have been devised for obtaining a considerable yield of penicillin and for rapid assay of its inhibitory power. From the culture medium a brown powder has been obtained which is freely soluble in water. It and its solution are stable for a considerable time and, though it is not a pure substance, its antibacterial activity is great. Various tests were done on mice, rats and cats. The tests made it clear that this substance possessed qualities which made it suitable for trial as a chemotherapeutic agent. Therapeutic tests were therefore done on mice infected with streptococci, staphylococci and *Clostridium septicum*. The general principle has been to keep up an inhibitory concentration of the substance in the tissues of the body throughout the period of treatment by repeated subcutaneous injections. The doses employed have been effective and not toxic; they may have been excessive. The solution contained 10 mg. per cubic centimeter of substance. In the first streptococcal experiment the treatment was continued for only twelve hours. That this was inadequate was shown by deaths occurring during the ten day period. In the second experiment the time of treatment was lengthened with improved results. In this and the two staphylococcal experiments, injections were given every three hours for the first

thirty-two or thirty-seven hours and then at longer intervals. In preliminary experiments with *Clostridium septicum* it was found that the infection could be satisfactorily held in check as long as penicillin was being given (that is, for two days) but that when the administration was stopped the infection developed. In another experiment the injections were given for ten days every three hours for forty-one hours and then at longer intervals, and twice daily for the last two days of the period. No deaths have subsequently occurred (twenty-two days after the beginning of the experiment). The results show that penicillin is active in vivo against at least three of the organisms inhibited in vitro. Penicillin is particularly active against the anaerobic organisms associated with gas gangrene.

Medical Journal of Australia, Sydney

2:77-100 (July 27) 1940

Recognition and Treatment of Difficult Labor. F. L. Wall.—p. 77.
Outbreak of Cerebrospinal Meningitis in a Foundling Hospital: Treatment of Carriers with Sulfapyridine. J. F. Meehan and C. R. Merrillees.—p. 84.

2:101-124 (Aug. 3) 1940

Rheumatic Heart Disease. H. B. Graham.—p. 101.
Mustard Gas, with Special Reference to Eye Lesions. D. R. Gawler.—p. 106.

2:125-146 (Aug. 10) 1940

Chemotherapy of Pneumococcal Infections. A. W. Holmes & Court.—p. 125.
Summary of Recent Knowledge of Clinical Application and Toxic Effects of Sulfanilamide and Sulfapyridine. A. Murphy.—p. 129.
Sulfapyridine in Treatment of Pneumonia: Review of Eighty Cases of Pneumococcal Pneumonia. A. G. Cumpston.—p. 132.

2:147-166 (Aug. 17) 1940

Investigation and Diagnosis of Ethmoiditis. D. G. Carruthers.—p. 147.
Histology of Nasal Polyps. A. D. Gillies.—p. 149.
External Fronto-Ethmoid Approach. H. Kirkland.—p. 149.
Operative Treatment of Ethmoiditis. B. B. Blomfield.—p. 150.
Treatment of Ethmoid Suppuration and Polyposis After Operation. J. P. Findlay.—p. 151.
Perinephritis. I. J. Weyman.—p. 152.

2:167-186 (Aug. 24) 1940

Surgical Treatment of Hemorrhage Associated with Gastroduodenal Ulceration. H. C. R. Darling.—p. 167.
Treatment of Peritonitis. A. E. Lee.—p. 170.
Parkinsonism: Account of Disorder and Its Treatment, with Special Reference to High Atropine Dosage Therapy. J. F. Hughes.—p. 174.

South African Medical Journal, Cape Town

14:271-290 (July 27) 1940

Leukocytosis. S. Zavadier.—p. 273.
Observations on Diabetes. W. J. May.—p. 276.
Treatment of Severe Open Fractures of Shafts of Tibia and Fibula. S. V. Humphries.—p. 280.

Archivos Argentinos de Pediatría, Buenos Aires

14:1-114 (July) 1940

*Problem of Tuberculosis in First Three Months of Life. A. Ariztia.—p. 3.
Delayed Osteosarthyrosis, Exostosis and Local Achondroplasia: Case. J. P. Garrahan, A. Largaia and M. Malenchini.—p. 45.
Idiopathic Anemia of the Newborn. C. Ruiz.—p. 65.

Tuberculosis in Infants Under Three Months.—Ariztia traced the evolution of tuberculous infection in twenty-three infants under 3 months of age born of multiparous underprivileged mothers with advanced pulmonary tuberculosis, most of the mothers (nineteen) dying from tuberculosis within several weeks after delivery. Separation from the mothers at birth, feasible in a number of cases, did not act to prevent infection and death in all cases. An initially grave condition was almost invariably observed in those prematurely born, weighing generally less than 4½ pounds (2 Kg.) and presenting manifest indications of congenital debility together with high fever, enlargement of the spleen and liver, pyuria and regurgitations. Tuberculous were also observed occasionally. The author, however, calls particular attention to the cases which initially presented a complete absence of clinical symptoms but had a fatal anticlimax. Neither elevation of temperature, loss of body weight nor clinically observable objective signs occurred at first. The disease evolved slowly and deceptively, manifesting only a localized lesion which either did or did not become generalized. The symptoms appeared only shortly before a fatal termination.

The author emphasizes the diagnostic value of tuberculin tests and x-ray examinations. Tuberculin tests (Pirquet followed up by Mantoux, if Pirquet remained negative) were positive in all cases except two. In one of these only peritoneal tuberculous lesions were discovered at necropsy. The author believes that tuberculosis in infants under 3 months, born of tuberculous mothers, deserves greater attention as its course differs from that of older infants. Since the asymptomatic period is fraught with danger to the child's life, he advises the combined use of the diagnostic aids of tuberculin and x-rays without delay. In one case in which the child had been separated at birth from its mother and the pathologic condition had been positively established by tuberculin tests and x-ray examinations on the forty-fifth day, the symptoms, consisting in fever, loss of weight, splenomegaly and pyuria, did not manifest themselves until the end of the eighth week. Seventeen deaths occurred in the twenty-three cases reported. The type of lesions found is shown in a number of films.

Archivos de Pediatría del Uruguay, Montevideo

11:621-684 (Aug.) 1940. Partial Index

*Insulin Lipodystrophy in Diabetic Children. M. L. Saldún de Rodríguez.—p. 642.

*Roger's Disease. B. Delgado Correa and O. Macció.—p. 652.

Insulin Lipodystrophy in Diabetic Children.—Saldún de Rodríguez reports three instances of lipodystrophy in children occurring in the course of the second or the third year of insulin therapy. This incidence occurred in a group of thirty-eight children with diabetes living under fairly satisfactory conditions of proper diet and insulin therapy. The insulin was administered in two or three daily doses of from 2 to 7 units for each injection, or in a daily total dose of 4 or 5 units. The injections were given in the external aspect of either thigh. The lipodystrophic lesions were symmetrical and located at the seat of injections in two cases and in the gluteal region in one case. The author believes that insulin lipodystrophy, either local or at a distance, is due to repeated injections of insulin in the same area in children predisposed to this condition from a disturbance of the nervous system. Injections of insulin make the region less sensitive to pain. For this reason the patient and the family ask the physician to give the injections in the same area. This practice must be maintained in order to prevent the occurrence of lipodystrophy.

Roger's Disease.—Delgado Correa and Macció found inter-ventricular communication of the pure form in forty-one of ninety cases of congenital heart disease. The condition was well tolerated and caused no functional disturbance. Coincidental with this abnormality, there was deaf-mutism in two, mongolism in two, facial asymmetry in one, thoracic abnormalities in three, rickets in three and muscular atrophy in one. Clinical diagnosis of the abnormality was made in thirty-five cases because of the presence of a loud systolic murmur audible over the cardiac area, especially at the left intercostal space, and which did not change in different positions. There was duplication of the second heart tone due to pulmonary hypertension in four cases, cyanosis in seven, dyspnea in eight, polyglobulia in one and precordial pain in one. The roentgenograms of the heart showed enlargement of the ventricles, which was unilateral in fourteen cases and bilateral in twenty-four. The electrocardiogram was normal in cases of inter-ventricular communication of the first and second degrees and showed either right or left ventricular preponderance in cases of inter-ventricular perforation of the third degree. A frequent abnormality was a deep Q wave in the third lead.

Geneeskundig Tijdschr. v. Nederl.-Indië, Batavia

80:1773-1820 (July 23) 1940

*Vitamin B₁ Content of Blood in Healthy Persons and Patients. S. J. E. Pannekoek-Westenburg and A. G. van Veen.—p. 1774.
Stimulation of Heart in Infectious Diseases. R. van Wesel.—p. 1785.

Vitamin B₁ Content of Blood.—Pannekoek-Westenburg and van Veen report studies on the vitamin B₁ content of 390 blood samples of healthy persons and of patients. The determinations were made by Meiklejohn's modification of Schopfer's test. This test estimates the amount of vitamin B₁ by means of its growth-promoting activity on the mucus *Phycomyces blakesleeanus*. The thiamine values of the blood of healthy natives

tallied with those mentioned in the European and American literature. The author regards 5.5 micrograms per hundred cubic centimeters of blood as the limit of B₁ deficiency. In six of the ninety healthy natives the thiamine content was 5.5 micrograms or less. The thiamine content of the blood of 165 patients with nutritional edema was on the whole like that of the healthy persons. Thus it seems probable that there is no relation between the nutritional edema and the thiamine level. However, among a group of twenty-two persons there were thirteen with low values; the fact that these patients had severe anemia with low cell counts is regarded as a possible explanation of the low values. Nineteen patients with manifest beriberi had divergent thiamine values; nine had low values, but some with severe beriberi had normal values. This may be explained by the fact that the patients may have had food with a high B₁ content or even B₁ tablets before they came for treatment, because the natives know the cause of beriberi. Of nineteen patients with polyneuritis of various origins all but two had a normal B₁ level. Of the two patients with low values, one had syphilis and one alcohol polyneuritis. The thiamine values of ten patients with tabes dorsalis was normal. On the basis of these observations the author concludes that the determination of vitamin B₁ in the blood is as yet of no great practical importance.

Acta Chirurgica Scandinavica, Stockholm

84:97-186 (Aug. 24) 1940

Double Gallbladder in Connection with Two Cases. E. Millbourn.—p. 97.

Hemorrhage in Iliopsoas Muscle Causing Injury to the Femoral Nerve: Report of Second Case. A. Tallroth.—p. 124.

Investigations on Anatomy and Function of Ductus Thoracicus. L. Efskind.—p. 129.

Two Cases of Intra-Articular Xanthoma in Knee Joint. H. Cederlund.—p. 143.

*Three Cases of Hyperinsulinism with Hypoglycemia Treated by Removal of Adenomas from the Pancreas. P. Windfeld.—p. 155.
Vascular Changes After Intravenous Injection of Thorium Dioxide. L. Efskind.—p. 177.

Hyperinsulinism Treated by Removal of Pancreatic Adenomas.—Windfeld presents histories of three patients observed at the Rigshospital in Copenhagen exhibiting hyperinsulinism caused by adenoma of the pancreas. All three patients had attacks of severe hypoglycemia which did not yield to dietetic treatment. Mental disturbances were prominent. The attacks occurred especially in the morning before the intake of food but also after physical exertion. Fatigue, lack of desire to work and depression predominate in the beginning, but later acute states of confusion, coma and clonic-tonic convulsions appear. Because the attacks resemble epilepsy, these patients are often sent to neurologic and psychiatric departments. Determination of the blood sugar during attacks will reveal the existence of hypoglycemia, and the subsidence of the attack on the ingestion of dextrose will confirm the diagnosis. Whipple emphasizes the following triad of symptoms to be found in all cases of hypoglycemia due to insuloma: (1) periodic nervous disturbances when fasting (2) in connection with hypoglycemia and (3) the favorable effect of the ingestion of dextrose. Whipple considers a case not amenable to surgical therapy if this triad is not present. Before operation is decided on, hypoglycemia from other causes (Addison's disease, Simmonds' disease, myxedema, hepatic disease and so on) must be ruled out. The author points out as especially characteristic the fact that patients with insuloma are nearly always fat in contrast to the thin or cachectic patients of adrenal or hypophyseal disorders. Detection of insuloma by roentgenography is almost never possible because of the small size of the tumors; their diameter rarely exceeds 2 cm. and they usually are embedded in the substance of the pancreas. Two of the patients had an adenoma the size of a hazel nut and of a cherry, respectively, in the head of the pancreas. The third patient had two adenomas the size of a large pea in the caudal portion of the pancreas. The author concludes that if attacks of hypoglycemia cannot be warded off by dietetic treatment an operation ought to be advised, for with protracted hypoglycemia irreversible changes gradually take place in the ganglions of the brain with persisting mental disturbances. Furthermore, about one in four of the insulomas removed have been malignant and exhibited a tendency to give rise to metastases.

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The Physician Himself

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BOSTON

There has been much ado in late years about the welfare, physical, mental and spiritual, of the butcher, the baker, the candlestick maker, the rich man, poor man, beggar man, thief, and even the lawyer and the Indian chief. The doctor, however, a vital factor in the campaigning for all these other souls, has been more or less left to look after himself, and, too much engrossed in the problem of helping others, he has too often neglected his own welfare. It is of some of the problems of the doctor, the noblest Roman of them all, that I would like to speak to you today.

Each one of us has his own body, mind and soul to look after but we often seek aid of others of our profession to advise us in all these fields, in fact, much more than we do of friends who are not doctors. In the course of talking with some 600 physicians who have been patients of mine and with the families of as many more, I have gradually become acquainted with some of the peculiar and unpeculiar problems that beset the doctor. This opportunity I have cherished more than any other in my work. Doubtless many of you, too, have had as rich or richer an experience but I hope that what I have to say may here and there bring helpful suggestions.

CARDIOVASCULAR DISEASE AMONG PHYSICIANS

The doctor's heart has become his own chief health concern. The frequency of cardiovascular disease among the physicians of the United States has in recent years been stressed annually in an editorial in THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION summarizing the causes of death in the American medical profession. In 1939 there were 3,710 deaths among about 175,000 doctors of medicine. The average age at death was 66 years, which might be worse but should be better. Heart disease was recorded as the cause of death in nearly half of the cases (1,585). Arteriosclerosis (453 cases), pneumonia (370), cerebral hemorrhage (368), cancer (357)

and nephritis (174) followed in that order. Diabetes mellitus claimed ninety-one, tuberculosis sixty and aneurysm five. If we include arteriosclerosis, cerebral hemorrhage and aneurysm and at least some of the cases of nephritis along with heart disease as cardiovascular disease, as of course we should do, then the total is very imposing (2,503 out of 3,710), far over 50 per cent, in fact a full two thirds. This is probably more or less the run of other professional men and in business, or perhaps a higher figure. The "cardiac" deaths have risen partly because of changes in customs of diagnostic nomenclature, partly because of greater accuracy and partly because other serious and earlier diseases (especially the infections) are on the wane. Then, too, of course there may be an actual increase. We can't tell yet. Certainly the doctor's life is a hard one and he doesn't have time or energy or initiative enough to lead a physically healthy life. He rarely can or does practice what he preaches. How much this fact has to do with the frequency with which he is hit by serious coronary disease is hard to tell; one may suspect that there is some sort of a connection.

It may be of interest to you to know what kinds of heart disease I have encountered among my own doctor patients, and some of my conclusions about them. Among the last hundred physicians whom I have examined because of symptoms or signs or suspicion of heart trouble, fifty-one had coronary disease with or without complications; only nine of these had hypertension; twenty-three had myocardial infarction without hypertension; ten had angina pectoris on effort only; one had rheumatic aortic regurgitation and angina pectoris, while the diagnosis in eight cases was based on clearcut electrocardiographic evidence alone (bundle branch block or abnormal T waves). Fourteen per cent of the group were hypertensive, nine having also coronary disease; one of the hypertensive patients had mitral stenosis. Third in the etiologic diagnostic list was rheumatic heart disease with 11 per cent; one of these patients had angina pectoris and

one was hypertensive. The commonest rheumatic valve lesion was aortic regurgitation, comprising 7 per cent of the total cardiac series, uncomplicated by mitral disease in 5; mitral stenosis was diagnosed in 4 per cent. Calcareous aortic stenosis was present in two cases and syphilitic aortitis with aortic regurgitation in one; no case of a saccular aortic aneurysm was encountered. Congenital heart disease (with auricular septal defect), subacute bacterial endocarditis, chronic cor pulmonale, acute cor pulmonale, thyrotoxicosis and "toxic" myocarditis were responsible for one case each. Pericarditis was present in two cases, one neoplastic and one unexplained. Eleven per cent of the patients were in congestive heart failure when I first saw them.

Thus, three fourths of the patients (76 per cent) were thought to have organic disease back of their heart trouble and yet there were a good many so-called functional disorders alone, and many more doctors have told me of or asked questions about their disorders of function (a kind of curbstone consultation) than ever came for examination. Among the hundred analyzed here four had uncomplicated extrasystoles, four had uncomplicated neurocirculatory asthenia (in seven others the neurocirculatory asthenia complicated other conditions); in three there was simply a cardiac neurosis, which in seven others was superimposed on something else; one had an unimportant functional murmur. One of the most interesting groups was that of three cases of auricular fibrillation with apparently normal hearts (two had resulted from excessive use of tobacco); in three other cases auricular fibrillation complicated heart disease. Of other arrhythmias paroxysmal tachycardia was found in four patients with organic heart disease, auriculoventricular heart block in three, and bundle branch block in five, an important finding ascertained only by electrocardiogram.

Eleven of this series of 100 patients had no heart trouble at all, either organic or functional, although they came as suspects. Two had gallstones instead, one had pleurisy, one a hiatus hernia, one a normal electrocardiographic variation, one a displacement of the heart to the left by old phthisis, one unexplained chest pain, one simple hypertension, and three others wholly normal hearts.

INDIVIDUAL PHYSICIANS WITH HEART DISEASE

I should now like to comment briefly on some individual "cardiac" doctors whom I have seen, to emphasize certain points of interest and importance. It is possible to be an excellent physician in good health after years of hard work and rich experience despite the presence of the acyanotic type of congenital heart disease, patency of the ductus arteriosus, for example, present in one of my colleagues. It is possible

to live with rheumatic valvular disease a long and useful life with no handicap to health therefrom and even without knowledge of the heart disease until nearly 80, as in the case of our own noted Dr. Herman F. Vickery, who showed at autopsy, after dying of pneumonia at 83, clear evidence of moderate mitral stenosis of rheumatic type. But unfortunately it is also possible to die in youth of acute rheumatic myocarditis superimposed on chronic rheumatic aortic valve disease, as happened to my friend George Reynolds last year, when while very tired he developed a streptococcic sore throat. I have found aortic stenosis of the calcareous type, quite possibly superimposed on old rheumatic valvular disease, in a few doctors, tolerated well for years but finally responsible for severe heart strain in later life. In one of these physicians a moderately loud precordial systolic murmur, causing rejection for insurance in middle age, was allowed to go unchecked after that in the rush of the doctor's life until abrupt left ventricular failure ten or twelve years later called attention to the classic evidence of aortic stenosis. I feel quite sure that annual physical examinations by a sensible colleague after the first discovery of the murmur could have revealed the enlarging heart and impending failure and have resulted in the postponement of disability by earlier reasonable regulation of life and earlier digitalis therapy. Some preventive medicine should certainly have been practiced in his case.

Another lesson I learned, and I suspect that we have all had to learn such a lesson, was in passing off as manifestations of fatigue and nervousness some palpitation and precordial and substernal aching in the case of a middle-aged doctor who showed no abnormality of the heart or aorta by physical examination, fluoroscopy or electrocardiogram but who, a year later, presented a very slight early diastolic murmur along the left sternal border and a positive Wassermann test. Had we bothered to determine his serologic reaction on the first examination we would have been a year ahead on treatment; fortunately he has now done well after three or four years of specific therapy.

A number of doctor friends have allowed themselves to get much too fat and, although a good many escape harmful consequences, only a few live to an advanced age and too many succumb to hypertension or coronary disease before they are old. I am thinking of one of my colleagues from the Smithfield ham and Lynnhaven oyster country who too tardily heeded the advice to reduce his weight and, although he lived a model life after his disability began, barely passed the age of 60, hypertensive coronary cardiovascular disease ending the story. It isn't always possible, of course, to be master of one's fate and the doctor has a peculiarly hard job in looking after himself;

but the utter neglect of their health by so many physicians is appallingly common.

In this connection I would cite one other case, that of a good doctor who had gradually from force of circumstances become responsible for the health of some 3,000 or more persons in a widespread community in Maine. He was on call day and night; the people could not get on without him. Apparently nobody thought it would ever be otherwise or that he was subject to human fatigue until one fine day, at too early an age, he was struck down by a crippling coronary thrombosis. I can't help but believe that his excessively difficult professional life with its perpetual wear and tear had something to do with his illness and that it would have been far wiser—in the long run, or even in the short run—had he secured one or two young assistants before the day he was forced to get them. Two advantages would have resulted had he done this: In the first place he would have conserved his own health and strength and, secondly, the adjustment of the medical care of the community at the time of his acute illness would have been far easier for every one concerned.

The lessons we have been learning about the prognosis of coronary thrombosis have come from our experience with doctor patients even more perhaps than from lay patients, but I still find physicians the most apprehensive and more in need of treatment for their loss of morale than for the heart lesion itself. Fortunately a more optimistic point of view is developing among the doctors themselves but there were a few, even years ago, who helped to steer their own destiny. One doctor in particular I will mention, much beloved in his own community and elsewhere, and known to many of you, the finest type of physician I have met. Nineteen years ago at the age of 60, in the midst of a very large family practice, he was hit by acute coronary thrombosis. He made a good recovery but realized that he must change his mode of life. Therefore he began the study of a special field, my own as a matter of fact, and in all the years since, in travel abroad and in clinics and courses in this country, he has kept abreast of the times, carrying on an active and important cardiovascular consulting practice in the state of Pennsylvania. Even after he was well past 70 he repeatedly came up to us in Boston and was of the most alert of our graduate students, an inspiring example for us all.

Increasing years frequently bring with them defects in the coronary circulation with symptoms therefrom but fortunately in many cases, perhaps in most, compensation occurs as the result of the development of an adequate collateral coronary blood flow. Over a period of such adjustment for weeks, months or even a year or two, caution in living is important; but

after the adjustment has been established a fairly normal life can often be resumed. The danger comes mostly from carelessness during the critical period. Only a relatively few persons are persistently severely crippled by coronary insufficiency over periods of years; too often a neurosis, neurocirculatory asthenia, bothersome arrhythmia or even an arthritis or bursitis accounts for much of the persistently recurrent symptoms which may start as angina pectoris and slowly change with the passage of time. Even the electrocardiogram may improve greatly in the course of time after acute or sub-acute coronary disease, and sometimes it may remain normal at advanced ages. A year or two ago I had the pleasure of seeing a normal electrocardiogram of a physician then in good health at the age of 105; he has since died suddenly and quietly at 106.

INTELLECTUAL ACTIVITY

So much for a few of the observations concerning physical health that have resulted from my experience with doctors as patients. I make bold now to comment on the doctor as an intellectual being. The physician from time immemorial has held a place as one of the leading citizens of his community and of his country, quite naturally so because he had in the first place to have the innate intelligence to be accepted as a scientific worker by preceptor or school and secondly because he passes through an arduous and prolonged course of instruction which must perforce sharpen his wits and cultivate his ability to make quick and sensible decisions.

"Knowledge comes but wisdom lingers" is a proverb particularly applicable to the doctor of medicine.

As long ago as the early days of the Greek era, the important position of the physician was recounted by Homer. During the siege of Troy, Hector at one time ran wild through the Greek army, and Paris, with his arrows, had wounded Machaon, who with Podalirius looked after the Greek sick and wounded.

The spouse of Helen, dealing darts around,
Had pierced Machaon with a distant wound.
In his right shoulder the broad shaft appear'd,
And trembling Greece for her physician fear'd.
To Nestor then Idomeneus begun:
"Glory of Greece, old Neleus' valiant son!
Ascend thy chariot, haste with speed away,
And great Machaon to the ships convey;
A wise physician skill'd our wounds to heal,
Is more than armies to the public weal."

Much later Plato quoted Socrates as saying to Euthydemus "Of course you who have so many books are going in for being a doctor." Not that a doctor was or need be bookish but his reputation has been that of having read widely and deeply, mostly of medicine of course, but largely in the lives of the many individuals, patients and colleagues with whom he comes

in contact. There need never be an idle moment in his intellectual life, any more than in his physical life. He has less time and need for problem plays and mystery stories and the gossip of the day than any other citizen in the community; his day is one long experience of the sort in his practice, in his teaching or in his research. His life is in fact so engrossing that, as I have said, he too often neglects his health and also too often fails to utilize or even to set aside a bit of leisure for a little intellectual diversion or avocation, no matter what it may be, something absorbing but not difficult, a mental refuge at frequent intervals during his active career, and one to which he may retire when his job is done. Such an avocation may be reading classical or modern fiction or history or biography, or even the writing of such, listening to music or practicing it, drama, painting, photography or modeling, collecting books or maps or anything else, or even dabbling in the fields of the other professions. Too often I have found that the physician who is ill, and must take weeks or months or even a year or two away from his work, faces a void—he must suddenly develop a hobby or avocation. There are some, however, who really welcome a respite, after the first shock of the discovery of their illness has passed, in order to do a few of the things set aside during the years that have passed for just such an occasion. There is only a slight danger that the avocation may prove to be more absorbing than the original profession itself, but if a man is gifted he may become a better novelist, sculptor or musician than he was a physician. There have been some notable examples of this. Care, however, must be exercised that a good physician should not step down to become a mediocre worker in some other field. Also it is true that a man cannot serve two masters: a physician cannot wisely spend the majority of his time on activities unrelated to medicine and expect to retain the confidence and patronage of sick persons, students and his medical colleagues.

THE SOUL OF THE PHYSICIAN

But it is the soul of the physician that puts him in a class by himself, in a place of honor the world around. May it never be tarnished! Temptations have always existed to convert the profession of medicine into a trade, and never more than now; but few have succumbed. Though inarticulate, the great majority of physicians have kept their virtue and have not yielded their birthright for a mess of pottage. For the last few years there has been unseemly quarreling about the danger and degree of state medicine. There has been raised the sad vision of the control of the profession by politicians, as of a football to be kicked about by whomsoever might be in the saddle. Fortunately the loud outcries are subsiding, and sanity and

dignity are returning even to those who have made the greatest fuss. Not that the practice and teaching of medicine do not need constant revision and correction like every other human endeavor, but such revision has been going on ever since Adam anyway and it helps but little, in fact it probably retards real progress, to call from the housetops how badly medicine is practiced, administered or taught in any community or state or nation. One can accomplish more by gentler methods, especially by personal example. The unselfish lives of most physicians are still the most potent argument in favor of their enduring need and usefulness. After all the smoke of the recent conflict has died away, we shall still be able to hail with humble satisfaction the words of Robert Louis Stevenson when he said:

There are men and classes of men that stand above the common herd: the soldier, the sailor, and the shepherd not infrequently; the artist rarely, rarer still the clergyman; the physician almost as a rule. He is the flower (such as it is) of our civilization; and when that stage of man is done with, and only to be marveled at in history, he will be thought to have shared as little as any in the defects of the period, and most notably to have exhibited the virtues of the race. Generosity he has, such as is possible to those who practice an art, never to those who drive a trade; discretion, tested by a hundred secrets; tact, tried in a thousand embarrassments; and, what are more important, Heracleian cheerfulness and courage. So that he brings air and cheer into the sickroom, and often enough, though not so often as he wishes, brings healing.

Finally, there is one other aspect of the spiritual value of the doctor. He should not only himself possess the highest ideals but should also have a voice in helping to elevate the moral and spiritual level of his own community and country, indeed of the world, and he should make it heard. Just because he is a busy physician does not mean that he cannot have or express opinions other than on health. In fact his altruism and honesty, which are virtues innate in his profession, make him especially fitted to combat, in every way he can, deceit, cruelty, barbarism and immorality wheresoever they exist, in high places or low. In these tragic days gangster régimes in the name of nationalism have professed and practiced these evils. Why should we doctors who abhor such things shut our eyes to them? Let us be honest and lend a hand toward the restoration of nobler things in this world of ours, not simply in our own little corner of the world. We are all neighbors now on old Mother Earth, and we American doctors can still stand for the liberty, honor and brotherhood of man, rejected by the mailed fist and at the moment more in need of help than are our physical ailments, which seem trifling in comparison. We must help to see to it that the night that is falling on the world does not last the threatened thousand years.

It is of interest in this connection that as long ago as 1902, nearly forty years back, William Osler wrote about nationalism as follows:

Nationalism has been the great curse of humanity. In no other shape has the Demon of Ignorance assumed more hideous proportions; to no other obsession do we yield ourselves more readily. For whom do the hosannas ring higher than for the successful butcher of tens of thousands of poor fellows who have been made to pass through the fire of this Moloch of nationalism? A vice of the blood, of the plasm rather, it runs riot in the race, and rages today as of yore in spite of the precepts of religion and the practice of democracy. Nor is there any hope of change; the pulpit is dumb, the press fans the flames, literature panders to it and the people love to have it so. Not that all aspects of nationalism are bad. Breathes there a man with soul so dead that it does not glow at the thought of what the men of his blood have done and

suffered to make his country what it is? There is room—plenty of room—for proper pride of land and birth. What I inveigh against is a cursed spirit of intolerance, conceived in distrust and bred in ignorance, that makes the mental attitude perennially antagonistic, even bitterly antagonistic to everything foreign, that subordinates everywhere the race to the nation, forgetting the higher claims of human brotherhood.

It is our profession, we physicians, who can do as much in the future as any other group, in fact probably more, in breaking the bonds of fettering nationalism, and after the bonds are broken in helping to restore the brotherhood of man. These are indeed high words and high ideals, but they constitute a natural evolution from our more ordinary care of man's body.

Massachusetts General Hospital.

Medical Students and the War

The *Lancet* has just published a Student's Guide,¹ although forced to curtail detailed information formerly published in its annual education number.

Medical students in England share the natural impulse to go with their contemporaries into the fighting forces, but they are advised to stay where they are because they will be of more use to their country as qualified medical officers. To settle down to the humdrum of studying and passing examinations requires character, particularly at this time, and not all of them can make the choice. More than one dean has written of students leaving to join up, of others who had to be restrained by advice, and of many who did not seek or did not heed advice in their haste to make a more active expression of service. Those who have remained have won the respect of their teachers by their anxiety to become qualified physicians as early as possible and so be available for any service which their country will require.

Nevertheless, the students have clamored for training and work which may be immediately useful. Some medical schools have arranged courses for training them for serving at first aid posts and on fire squads. Students have attended lectures and drills in their leisure and some of them have been directly responsible for the organization of first aid units. Every student at Oxford has been given a job in the Air Raid Precaution arrangements of the Radcliffe Infirmary, such as anesthetist, operation assistant, blood transfusion assistant or assistant in the mobile unit. Although the students naturally have wanted to join the Home Guard, in several schools the deans have felt that this service would require more of their time than they could well spare. In some places students have been encouraged to do farm work over

the week-ends. The women students who have trained as auxiliary nurses at the Municipal Hospital have done well a deserving war service.

The most serious problem at the medical schools has been to carry on the usual high standard of teaching with a depleted staff. The emergency plans have reduced the number of good teachers available, and it appears to some that the arrangements were made without due regard to the needs of medical education. A dean suggests that many of the teaching difficulties now present might have been avoided if a committee or person had been appointed to see that the work of the students was disturbed as little as possible for emergency measures. "The doctors of tomorrow" deserve the best that present conditions can provide.

Some of the present makeshifts in the medical schools are decidedly makeshifts, but others may be the seeds of a new kind of growth. Not all of the results of the upheaval have been disastrous. After a preliminary scattering of the teaching hospitals some have called their students home again to the parent hospital, some have planned a new curriculum which takes the students on a round of hospital visits, and some have stayed at home with a depleted teaching staff since the beginning of the war. Not many of the provincial medical schools have been evacuated, although all have plans to move if necessary.

In the London area the medical students have usually been distributed to two or three sector hospitals. It has been found that what one hospital lacks another can supply, and students like the increased clinical opportunities. Students of several medical schools have become residents in the sector hospitals where the teaching members of the staff are living. This return to the old hippocratic tradition of the teacher and pupil living in close fellowship is valued

1. Students Guide, *Lancet* 2:267 (Aug. 31) 1916.

by the students. This may be, it seems to some, the only significant innovation in medical education during the war years.

The *Lancet* reviews the changes that have been forced on many of the medical schools:

At Oxford since the outbreak of war the course has been modified to enable the student to take his whole medical course and to qualify as early as possible. The honors examination in physiology is being taken only by those whose tutors especially recommend them; others are being given a pass B.A. degree on the result of their first B.M. examination, thus shortening their course by a year. The medical schools of London were so much disorganized at the beginning of the war that Oxford University arranged for students to continue their clinical teaching at the Radcliffe Infirmary. Accommodation is limited and the number of entries will be restricted to fifty students a year.

The ranks of medical students at the University of Cambridge have been increased by men from St. Bartholomew's Hospital to whom the university has given hospitality. The number of students at Cambridge has not fallen off; on the contrary, it was considerably increased over that of the previous year. University life goes on as usual.

Most of the schools of the University of London moved out of London when war was declared, many of them becoming guests of universities in other parts of the country. Many of the medical schools have since returned to London. There have been no drastic changes in regulations or training in the University of London since the outbreak of war; no examinations were canceled, but the whole series of autumn examinations last year had to be readjusted. Students are received by the university after passing matriculation and become members of one of the thirteen recognized medical schools attached to the teaching hospitals. The students' union at the University of London has given up many of its activities; the boathouse has been requisitioned and the university air squadron closed down and was attached to the Royal Air Force station.

At St. Bartholomew's Hospital Medical School for the first three months of the war the medical students were scattered to eleven different hospitals, but by last January it was possible to arrange a course of medical study and to group the students in a limited number of hospitals. At present there are about 700 students in the medical college. The preclinical students of St. Bartholomew's have been working at Cambridge. The first year students taught by the St. Bartholomew's Hospital staff have been permitted to work in the laboratories of the Leys School. The clinical students have been housed in three hospitals, their first year of clinical work being done at Hill End, their second and half of the third year at Bart's, and the rest at Friern Hospital. The students at Bart's have formed themselves into bodies for various duties—stretcher bearing and dressing—and they work in close cooperation with the administrative staff. Resident experience is rather uneven at present; a man stationed on Hill End, for example, gets no outpatient work. Plans are under way to change the location of resident officers to give them a more general range of experience.

At the outbreak of war, Guy's Hospital Medical School found new premises at Tunbridge Wells, where four large buildings were equipped and furnished, some as lecture rooms and laboratories and others as dormitories. There are accommodations for 300 students. The remaining students live in lodgings in the district. The students in the clinical years are working either at Guy's Hospital itself or at the sector hospitals at Pembury and Farnborough. After a preliminary clinical period at Guy's Hospital the students

are sent to the sector hospitals for appointments as clerk and dresser, and after that they return to Guy's for the remainder of their training.

Medical education has been carried on satisfactorily at St. Thomas's Hospital in spite of a smaller number of patients and the loss of various members of the teaching staff to the defense services. The remaining members of the teaching staff have taken on extra burdens, but the spirit of understanding and good will from the students has prevented these from becoming too heavy. The students have worked keenly and well under conditions which make concentration difficult. The preclinical students were evacuated to Oxford at the outbreak of the war and enjoyed the hospitality of Oxford's laboratories for a time until the physiology and anatomy departments at St. Thomas's could be reopened. The teaching of gynecology has been hampered by the reduced number of cases, but the best possible use has been made of the material available. At present, with the exception of a few students who work at special hospitals in the sector, the whole St. Thomas's Medical School is centered on its normal base.

Charing Cross Medical School has 143 students, who at the beginning of the war were dispersed to hospitals in the sector and formal teaching ceased for three weeks. Last January the students were recalled to London from all the sector hospitals except one, and since then the school has returned almost to normal, although the number of patients in the hospital has been greatly reduced. The social and athletic activities of the students' club have been curtailed and their place taken by organized work done in spare time in all branches of the Air Raid Precautions, every student being trained in first aid, stretcher bearing, fire fighting, and anti-gas measures.

For the first term of the war, preclinical students at Middlesex Hospital Medical School were sent to Bristol University. They were recalled last January and have been at work at Middlesex ever since, except for about sixty students who are still distributed in three sector hospitals. The preclinical students have been trained in Air Raid Precautions, especially fire fighting and anti-gas measures, and are available to act as runners. At present there are about 320 students at Middlesex Hospital.

Medical education at the University of Liverpool has been normal in the last year except for adjustments to meet Air Raid Precaution regulations. To expedite the training of students so they can serve as assistants in the wards as soon as possible, all academic and clinical courses have been brought forward by a turn, and the times at which resident house posts become vacant have been adjusted so that they correspond with the final examinations; thus the students may become resident officers immediately on qualifying. Social activities at the University of Liverpool have been little affected; the debating society meets each week and there have been as usual two dances, a ball and a dinner.

At the outbreak of the war the wards of the Cardiff Royal Infirmary, which is the chief hospital of the University of Wales School of Medicine, were almost emptied in preparation for war raid casualties, but after a month it was possible to fill the beds in the wards again with the customary types of patients; so far teaching has proceeded normally, although some teachers have joined the defense forces.

The University of Wales has received fifty clinical students from a medical school in London, in addition to its own students, and to accommodate them a drill hall adjacent to the school was hired for the teaching of pathology.

At the University of Edinburgh the medical course has been carried out during the past year on much the same lines as usual, although students in addition to

the usual courses have received special training in first aid, the treatment of air casualties and gas injuries. It has not yet been necessary to distribute the medical school to other quarters, but plans have been made if it becomes necessary.

It has been possible to continue medical teaching on normal lines at the University of Glasgow, where at present there are 1,170 students; laboratory work had to be modified for a while owing to the blackout. During the year the University of Glasgow has received 180 anatomy and physiology students with their teaching staff from Kings College, London.

Owing to the continued neutrality of Ireland, medical education at the University of Dublin has been little affected by the war and at present there are 465 students. Teaching in the ten clinical hospitals at Dublin also has not been materially influenced by the war.

At Kings College Hospital Medical School, for the first four months of war, teaching was carried on at several centers in the sector to which the medical students had been distributed, but since last January the work has been concentrated in Kings College Hospital itself, Horton Hospital at Epsom, and the Blind School Hospital at Leatherhead. However, the anatomy and physiology students from King's College were sent to the University of Glasgow. Students working in the sector hospitals accommodating Kings College Hospital Medical School live either in billets nearby or in the hospitals themselves. They find that the work in the several hospitals gives them a wider outlook than a fixed course in one hospital, but they get no experience with outpatients in the sector hospitals and they are cut off from laboratories, libraries and

museums. Kings College, however, has overcome these difficulties to some extent by sending books and pathologic specimens out to the sector hospitals.

The *Lancet* summarizes the situation in the other medical schools in Great Britain. In general, medical students in the London area have usually been distributed to several sector hospitals. While the fixed courses and routine of the student's existence have been greatly upset, this shoving and changing, the *Lancet* says, has proved stimulating rather than unsettling. The students like the increased clinical opportunities and there have been plenty of patients even if they have to be hunted out of scattered lairs. Few of the provincial medical schools have been evacuated, although all of them have made plans to move if necessary.

The dean of St. Thomas's sees lessons for the future in the present arrangements. The preliminary medical subjects and anatomy, he thinks, might well be taught in two or three large centers. The teaching of physiology, he says, should inform the whole medical course and should not be tucked away in a watertight compartment. He also sees in the future a curriculum no longer loaded with deadwood, and a more rational allotment of time in the various phases of training.

Digests and Reviews

"TWENTY-FIVE YEARS"

The School of Medicine of Washington University and affiliated hospitals in St. Louis has just published a beautiful booklet dedicated to the twenty-five years of training medical students and nurses and of caring for the sick since the hospital and medical group were constructed in the present location on Kingshighway adjoining Forest Park. Following the well known survey of medical schools by the American Medical Association and the report by Abraham Flexner for the Carnegie Foundation on medical education, the medical department of Washington University was reorganized with new hospital affiliations, and the new buildings constructed were dedicated in April 1915. The booklet reviews the history of the medical school from its beginning. The great task of finding those who would financially support the building of a great medical school with affiliated hospitals was guided by Robert Somers Brookings, who was president of the corporation at that time and who not only threw his own fortune and enthusiasm into this work but was able to obtain great sums from families, foundations and other sources.

The greatness of this institution is illustrated in the panoramic view of the campus on the cover of the booklet, in which grateful apprecia-

tion of the numerous gifts which provided these facilities and supported the multitude of activities that have been carried on in them throughout the twenty-five years is expressed. The three original laboratory buildings and much of their original equipment were given by Mr. Brookings, to whose vision the medical center stands as a monument. The names of Edward Mallinckrodt, Elisa McMillan and Oscar Johnson also are deeply engraved on this monument. Hundreds of others have contributed in proportion to their means to this enterprise, and still others have given in service and time a devotion that money could not buy. Beside individuals, several foundations have generously aided in the development and operation of the medical school. The General Education Board and the Rockefeller Foundation have given university endowments of more than \$6,000,000, the income of which mainly supports the clinical departments. The Commonwealth Fund, the International Cancer Foundation and the Markle Foundation have given generously to term grants to support research projects in hospitals and laboratories. Nevertheless the decline in yield from endowments in recent years has been great, and at present no department in the medical center has a budget large enough to meet its urgent needs, and the resources of the school are not sufficient to maintain the activities at

present levels or to permit new undertakings and improvements essential to normal growth. The most urgent need at present is for unrestricted funds to replace this loss, so that the essential activities can be maintained on a high level. Some of the particular needs of the school are discussed in this booklet.

No recital of figures or money spent or patients treated or students trained would serve to express the service rendered to the sick and the contributions to medical science made from these institutions, the members of the staff of which have included many of the foremost men in medical science.

Here one finds brief mention of some of the contributions to medicine. The first successful removal of a whole lung for cancer was performed in these hospitals, an operation now performed throughout the world. Surgeons from distant countries have come to this medical center for special training. The site of formation of the principal female sex hormone was first established in the laboratories of this medical school. The work begun here led to the isolation of this hormone by others in other universities, thereby establishing a cornerstone of the new science of endocrinology. Another member of the staff has to his credit the first isolation (elsewhere) of progesterone. Insulin, the hormone of the pancreas, is said to have been first isolated in pure form in these laboratories by methods since utilized in its commercial production. A technic which renders the gallbladder opaque to x-rays and therefore visible on the x-ray film, which was developed in this medical center, has greatly increased the accuracy of the diagnosis of gallbladder disease. Virtually every member of the staff conducts some form of investigation, and of the thousands of papers published from departments of the medical school during the twenty-five years some represent notable contributions which have made the authors eminent.

During the first quarter century of operation, 1,791 medical students from nearly every state in the union have been graduated from the medical school, 625 graduates have been trained as house officers in the affiliated hospitals, and 810 student nurses have graduated from the school of nursing. Twenty-five years ago the entering class of medical students was reduced to fourteen in consequence of the stricter admission requirements, but this number has increased gradually until in 1930 the present limit of eighty-two was reached. The number of applicants to enter the medical school at present is about ten times the number accepted, and the selection of the best qualified candidate is a difficult task. The medical school, however, has scholarships which make it possible to accept a few students of unusual ability and promise who without its aid would be unable

to study medicine. Loan funds are available to tide worthy students over periods of financial emergency, and last year scholarships amounting to \$12,000 and loans totaling nearly \$3,000 were awarded.

Last year more than 41,000 were treated in these hospital clinics. The 2,545 living graduates of the school of medicine and of the schools from which they sprang are engaged in practice and teaching throughout the world, and of the six continents only South America and Australia have no representatives in this medical school.

Among the numerous pictures in the booklet are those of members of the faculty twenty-five years ago who still continue in that capacity.

The booklet not only reviews the development of this great cooperative enterprise and its progress throughout the last quarter century but expresses the outlook in facing future opportunities to serve this community and to aid in promoting the health of mankind.

THE PLACE OF PATHOLOGY AMONG THE MEDICAL SCIENCES

Condensed from the First Kettle Lecture, by W. W. C. Topley, published in the Lancet, Dec. 3, 1938.

A scientific territory has no natural frontiers. Its borders are nebulous and changing. It may expand rapidly in one area and sometimes contract in another, and wherever it touches a neighboring field of work there is a mutual infiltration.

A growing science not only expands: it buds and divides. Physiology and pathology are offshoots of medicine. Pathology, in response to the stimulus provided by Pasteur and by Koch, has branched into medical bacteriology, and both physiology and pathology have united with chemistry to produce offspring that have demanded names of their own.

In each of the biologic sciences there has been a general drift from a systematic study of structure and relationships to a study of function, and from a study of any given function as an integrated whole to an analysis of the mechanisms on which that function depends. The movement is, of course, only a shift in the immediate focus of intellectual interest and effort.

Although this drift has been general and continuous in direction, it has not been continuous in rate; so that it is possible to ascribe to particular periods, and often to particular persons, an acceleration so striking as to constitute a new epoch in the branch of the science concerned.

Pathology, like physiology, began with a study of structural changes; but it was still in this phase when physiology had undergone its metamorphosis into an experimental science.

It does not follow that pathology is morbid anatomy or that morbid anatomists are the only

pathologists. A pathologist must have some knowledge of structural tissue changes, but he must also know enough physiology to relate abnormal structure to abnormal function, enough biochemistry to understand something of the chemical causes, or consequences, of the pathologic processes that he studies, and enough bacteriology and immunology to give him some insight into the mechanisms involved in infective disease. No man can be a master in each of all these fields; but they are all pathology, and none of them have an exclusive right to that title.

RELATION BETWEEN MORBID ANATOMY AND BACTERIOLOGY

If the common use of the label pathology as a synonym for morbid anatomy is misleading, the label bacteriology, as far as it implies a differentiation from pathology, is more misleading. The bacteriologist, properly so called, is clearly a particular kind of botanist. He studies bacteria as such. The medical bacteriologist, on the other hand, is a pathologist who is concerned with bacterial and virus infections of man and animals. He must spend much of his time and energy in studying the parasites; but he cannot neglect the hosts. The tissue changes associated with infection are clearly within his province.

A considerable part of the pathologist's work is still concerned with the observation of naturally occurring events not subject to experimental control. He has, therefore, to guard carefully against drawing premature conclusions from inadequate data, and rapid solutions are unlikely to come his way. What is less often realized is that he usually suffers from a similar disadvantage when he confines himself to the experimental field. Here, I think, there is a sharp contrast with physiology. It would not be a gross misrepresentation to attribute the rapid advance of physiology in the last half-century to the successful designing and exploitation of acute experiments—acute, I mean, in point of time. By his skill in this direction the physiologist has been able to obtain rapid answers to many of his problems, not only because experiments of this type give their answers quickly but because their very shortness of duration helps to eliminate the chance intrusion of many disturbing factors. It is altogether probable that similar methods will yield valuable results to the pathologist when he is in a position to use them, and one of the hopeful signs of the present day is the entry into the pathologic technic; but for a long time to come pathologists will be largely concerned with experiments that are as chronic as the processes they are designed to study, and the technic of the long term experiment will be an essential element in their training.

CATEGORIES OF SCIENTIFIC RESEARCH

Scientific research can be roughly divided into two broad categories: those inquiries that are determined mainly by the nature of the problem to be solved and those that are determined mainly by the nature of the technic to be employed. The great names and the great moments of science are associated with a transient merging of these two categories. A technic developed in an attack on one particular problem is found to be applicable to a multitude of related problems, all of which are pressing for solution. Such a period occurred in the bacteriologic field between 1880 and 1900, when, as Löffler put it, "Koch shook the trees and the apples fell." But it is seldom long before the advent of the period of diminishing returns. The new technic takes its place as one of the tools of science, but the advance on that particular front slows up until some new technic is invented. There are not many Pasteurs or Kochs, and the efficacy, even of these great ones, depends in part on the times in which they live and on developments in other branches of science that provide them with the instruments that they exploit. At most times, and for most of us, the choice is less happy. We can attack a chosen problem by slow and relatively ineffective methods, developing them a little where we can, or we can select a technic and apply it to such problems as it is clearly fitted to solve. There must always be compromise based on judgment and experience. The wise investigator will not attack a problem, however interesting or important it may be, if he sees no hope of solving it; nor will he, except when he is learning his trade, be content to apply some existing technic to a trivial problem merely for the sake of getting an answer that can be put on record.

Avoiding these extremes, the choice is free. We need both types of work; and, if we need them it is well to appreciate and understand them. There is, I think, a danger of judging too much on results, and particularly on the form in which results can be presented. The neat and tidy answer to one problem may represent no more significant advance than the ragged and partial solution of another. Above all, it is a frank misuse of words to suggest that the one result is more "scientific" than the others or has been gained by more "scientific" means. So long as the canons of working hypothesis, experiment and deduction are properly observed, and dubious conclusions from inadequate data are avoided, there is no reproach in facing the difficulties of a long road where no short road is available.

RELATION OF PATHOLOGY TO CLINICAL MEDICINE

Neither pathology nor physiology can ignore the problems of clinical medicine, though individual pathologists or physiologists may be well

advised to do so. The clinician, on his side, cannot ignore pathology and physiology. As a result of our labeling, and of the academic organization that has arisen out of it, boundaries have been erected that involve not only separate professional chairs and readerships but separate institutes. Some such separation was inevitable, if only for administrative purposes; but it is worth while to ask two questions: Does it matter? If so, can we do anything to neutralize it?

The answer to the first question, so far as research is concerned, is that for the really original worker, the man who will do the biggest things, it does not matter at all. He will find the niche that suits him, and if he wants help from others, or knowledge that lies outside his immediate sphere of activity, he will get it in one way or another. For the ordinary man I think it matters much more. I do not, for instance, think it is good for a young pathologist in his early or middle twenties to be labeled a morbid anatomist or a bacteriologist or a pathologic chemist and run in blinkers from that day onward. If he is to go far he may, in the long run, have to be mainly one of these things, but a more general background, acquired by some years of browsing in a wider field, is far more likely to put him on a fruitful and congenial line. He will, for one thing, be able to wander in the borderlands, and borderlands are profitable places to explore.

From the point of view of the application of physiologic or pathologic knowledge to curative or preventive medicine I believe that the existing separation matters profoundly. It is the main reason why medical practice and medical science fail to advance as quickly as they might. If the present separation of the medical sciences is harmful, can we do anything about it? I think we can.

INFILTRATION AND INTEGRATION IN MEDICAL EDUCATION

The crux is clearly education. I know of no other curriculum which is so frankly a system of almost disconnected examinational hedges to be jumped and forgotten. The student does not carry much chemistry or physics into his two years of anatomy and physiology. When he starts clinical work he is sometimes told quite frankly by the surgeon that he can forget most of his anatomy and, by the physician, that he can forget most of his physiology. If he fails to be told this in explicit terms, he deduces it himself from the fact that he hears little more of these subjects. By this time, of course, he needs no telling to forget his chemistry and physics. He has done that long ago.

With pathology, in its wide sense, the case is not so bad, for its study extends well into the clinical years; but it is bad enough. The

real test of a satisfactory education in medicine is that it should, at one and the same time, fit the student for the work he is going to do in life and teach him to understand and apply the principles on which all true scientific work is based.

Much could be done by a system of infiltration, and in this infiltration I think that pathology, in the broad sense, has an essential part to play.

We should introduce the concept of disease processes, of abnormal function and structure, much earlier and continue the teaching of the ancillary sciences much later in the medical curriculum. This would mean the scrapping of certain things that are now taught, but I would willingly let them go. If the student knows well those parts of anatomy, physiology and pathology that have a direct bearing on his clinical work—knows them so that he can grasp their significance and can discuss them intelligently—he will be a better scientist and a better clinician than if his heritage from his preclinical studies is a vague recollection of a partially digested mass of unappreciated facts and theories.

Apart from the thorny question of medical education, there are other things that we can do if our general aim is to break down existing barriers and build as few new ones as is possible. Separate chairs of morbid anatomy, bacteriology and pathologic chemistry have become an obvious administrative necessity; but I mistrust the housing of this family of sciences in different buildings, nor would I give to one more than another the right to adopt the family name of pathologist.

We shall do well to encourage men whose early training has been in one scientific field to migrate to another and to look favorably on a shift of subject matter from one departmental territory to another. As subjects grow and their technical methods extend or change, there are many problems that are best dealt with in departments other than those in which they first arose. Bacterial enzyme systems, for instance, are clearly the concern of the biochemist rather than of the bacteriologist. We should, at least, be wise not to take out patent rights in any subject but to welcome to adoption even of our pet problems by any one who is prepared to treat them intelligently.

In pathology, the establishment of research institutes and of diagnostic laboratories, in addition to university and hospital departments, is tending to separate three functional classes—the research worker, the applied or so-called clinical pathologist and the teacher. Kettle would, I think, have endorsed the view that most pathologic investigators are the better for a period, if only a short one, spent in diagnostic work, and that the routine worker profits greatly

by an opportunity to attack some of his problems as ends in themselves.

I believe that freer movement across these functional barriers would solve many of our difficulties. Some men will do their best work as investigators, some as teachers and some in applying their laboratory technic to clinical or public health problems. But it is not always clear at the start where a man's gifts lie, and a change of work and experience, a few years' teaching for the research worker, a few years' continuous research for the teacher, and so on, would keep open paths that are closed by premature limitation to one field of activity.

In addition to trying to abolish barriers that already exist, we must prevent the erection of new ones. For example, clinical science, which bears the same general relation to clinical practice that academic bears to applied pathology, is rapidly developing along lines of its own. This movement is perhaps the most important and the most hopeful of the many signs that the medical sciences are developing—that elusive entity known as a Group Mind. It is not altogether fanciful to note the growing evidence that the individual mind, for its healthy functioning, depends much less than we had supposed on localized and specialized areas of activity, and much more on the effective integration of cerebral activity as a whole. To insure such integration in the growing mind of medicine, we must insure that the morbid anatomist, bacteriologist or biochemist who works for the time being in a department of clinical science is not separated in any way from his colleagues who work in the departments that are labeled morbid anatomy, bacteriology or biochemistry.

No man can compass the range of the medical sciences; but we can develop a common tradition, a common background of knowledge and a common way of thought. We can do this best by breaking down existing barriers and erecting no new ones and by training those who

come after us to respect scientific method, which includes accurate and critical observation, rather than to acquire, and then forget, an arbitrary collection of unrelated facts and theories.

Pathology, in the course of its development, has faced its own problems and devised its own ways of solving them; but we shall best serve medicine, and ourselves, by not stressing too strongly the particular technical methods on which we have relied in the past, and by a willingness to discard labels or disregard them. If institutes of pathology housed workers who would, under our present conventions, be regarded as physiologists, pharmacologists or biochemists, as well as morbid anatomists and bacteriologists, and if to these could be added others whose usual label would be clinicians, we should not only increase the value of the work done in these institutes but provide the personal links that alone make possible effective cooperation. To be fully effective there would have to be free interchange. It would become a matter of temporary convenience whether a man worked in the department of physiology or the department of pathology, or whether another chose, for the moment, to regard himself as a bacteriologist or a biochemist. It would be essential that there should be no prescriptive rights to senior posts, that a man should not, because he chose to wander between two or more departments, be debarred from normal promotion to any one of them.

There is one factor on which the success of all such dreams depends, and that is the personal one. Cooperation can never be forced, though it can be encouraged. In Kettle's death we lost one who had the gift of true cooperation at its best. His last years were spent in laying the foundations of the department of pathology of the British Postgraduate Medical School, and in his last few days he was thinking of its interests.

Comments

Twenty-two years ago in the worldwide pandemic of influenza there were more than 200,000,000 cases, and upward of 10,000,000 deaths occurred in less than twelve months. In the United States alone there were more than 20,000,000 cases and about 450,000 deaths in less than six months.

Dr. John Lambert Richmond was the first surgeon in the United States to perform a successful cesarean section. The operation was done in Middletown, Ohio, in 1827, without adequate assistance, with only a small pocket case

of instruments by the aid of candlelight. The mother survived, but the child died. Dr. Richmond graduated from Ohio Medical College in 1822.

The first operation for gallstones was performed by Dr. John Stough Bobbs of Indianapolis, June 15, 1867. The patient survived and lived for many years afterward. The operation was performed in an upstairs room in a business block. Dr. Bobbs was one of the leading surgeons in Indiana of his day and was the first professor of surgery in the old Indiana Medical College, organized in 1869.

Medical College News

Medical schools, hospitals and individuals will confer a favor by sending to these headquarters original contributions, reviews and news items for consideration for publication in the Student Section.

Clinical Work for Jefferson Juniors

The students of the junior class at Jefferson Medical College, Philadelphia, this year are following a new schedule made up of fewer didactic lectures and more clinical work. The clinical clerkships in the departments of medicine, surgery, pediatrics, dermatology, otology, laryngology, genito-urinary surgery and physical therapy consist of groups of eleven students in a section in attendance on patients of the Curtis Clinic, which is the outpatient department of Jefferson Medical College Hospital. The junior class numbers 130 members, including fourteen students from Alabama, North Carolina, Dartmouth, Wake Forest and Missouri.

Cornell Students Elect Military Training

Training in military medicine has been elected by almost half of the student body of Cornell University Medical College, New York, where courses in the subject are being offered to all four classes, the college announces.

Of the 274 male students, 113 are taking military training and will be eligible on graduation for commissions as first lieutenants in the Medical Reserve Corps.

Designed to provide the army with trained, young, medical personnel, similar courses are being given in about thirty selected medical colleges throughout the country, Cornell being the designated place of study for New York. Dr. Philip B. Connolly, Lieutenant Colonel, U. S. Army, retired, has been detailed by the war department to direct the study here.

Supplementing the college's regular medical curriculum, the courses cover the principles of military science, first aid, treatment of war wounds, camp and field sanitation, preventive medicine as it relates to the diseases common to armies, and related subjects. In addition to didactic instruction and demonstrations, a six weeks camp is held at Carlisle Barracks, Pa., at the end of the second or third year.

Alien Students Must Register

The Department of Justice recently issued a statement cautioning the 6,000 alien students now in this country that they must be registered and fingerprinted before December 26. Because they have been admitted under a special non-quota classification, alien students must present acceptance credentials from a school or college approved by the student division of the Immigration and Naturalization Service, which supervises their activities after admittance. Non-quota alien students are required to carry at least twelve semester hours of academic work, and they must be 15 years of age or older at the time of their admission. The average age of alien students now in the United States is 18. The largest group of alien students in this country today is at Montezuma Seminary, Montezuma, N. M., where 330 students from Central and South American countries are enrolled. These students have been coming to this country since 1937 instead of attending seminaries in Rome and other European cities. The second largest group of alien students (280) is at the University of Michigan; the third (260), at Columbia University; the fourth (175), at the University of California; Harvard, Massachusetts Institute of Technology and the University of Chicago each have 100 or more.

Aviation Medicine at Virginia

The University of Virginia School of Medicine, Charlottesville, is offering a course in aviation medicine this year, including lectures sponsored by the U. S. Army Air Corps and given by a medical officer of the army, and lectures in the departments of physiology, otolaryngology and cardiology. This, it is said, is the first medical school in the country to offer a course in aviation medicine.

Harvard's National Scholarships

Harvard University, Cambridge, Mass., announced, October 11, the award of National Scholarships, the outstanding awards to students entering Harvard Medical School this fall, to James S. Clarke, LaGrange, Ill., S.B., Harvard '40; Martin E. Flipse Jr., Douglaston, L. I., N. Y., A.B., Hope College '40, and Winsor C. Schmidt of Rye, N. Y., who attended Yale. Winners of the scholarships who maintained honor records continue to hold the awards until graduation. The holders of National Scholarships now in the medical school are: Louis E. Ward '43, Mount Vernon, Ill.; Allan L. Friedlich Jr. '43, New York; Glen R. Leymaster '42, Aurora, Neb.; Clarke T. Case '42, Pymmana, India; Laurence G. Wesson Jr. '42, Boston; Ward S. Fowler '41, Eldora, Idaho; Carl C. Gardner Jr. '41, Columbia, Tenn., and William F. Loomis '41, Tuxedo Park, N. Y.

West Virginia Sophomores Honor Freshmen

The sophomore class of West Virginia School of Medicine, Morgantown, held its nineteenth annual "mix," honoring the freshman class, September 18, at Newman Hall, and nearly all the members of the faculty and student body were present. Refreshments were served. Dean Edward J. Van Liere welcomed the new students, as did Robb S. Spray, Ph.D., professor of bacteriology and public hygiene, and Dr. Simon B. Chandler, professor of anatomy and neurology. During the summer the medical school buildings were redecorated throughout, and several new microscopes were added to the department of bacteriology and pathology.

Western Reserve Changes Curriculum

The medical school of Western Reserve University has decided to substitute required additional work in biochemistry, biostatistics, medical psychology, physiology, pathology and immunology for the optional work in the first year and several optional courses in the second year. Experience indicates that this is advisable to insure a sufficient knowledge of fundamental subjects. Neuro-anatomy will be moved from the second year to the first year. The total number of required hours is increased from 850 to 1,017 in the first year and reduced from 904 to 864 in the second year.

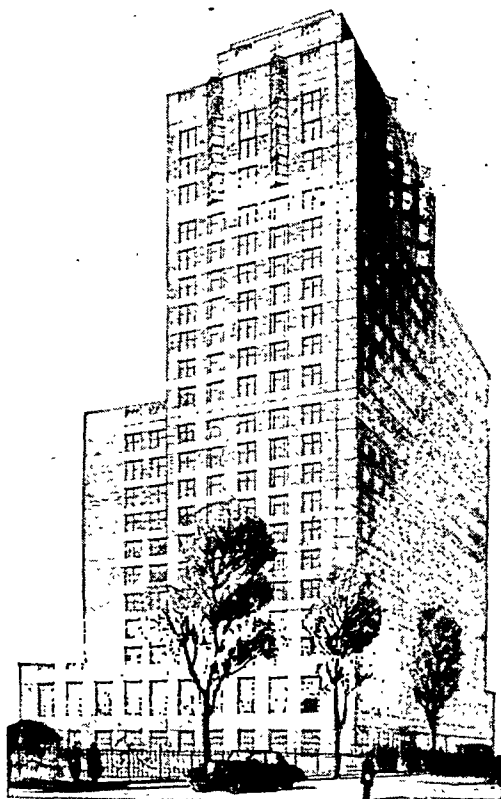
California Visitors

The University of California Medical School, San Francisco, and the laboratories of the Division of Biochemistry in Berkeley recently had the pleasure of visits from Dr. Arthur J. Walker of Freetown, Sierra Leone, South Africa; Dr. George W. McCoy of the U. S. Public Health Service; Dr. Andrew W. Sellards of Harvard Medical School, Boston; Dr. Karl Menninger, Topeka, Kan., who delivered an address before

the California Academy of Medicine in San Francisco; Dr. Philip C. Jeans, professor of pediatrics, State University of Iowa College of Medicine, Iowa City, following a trip to Los Angeles, where he had given a series of clinics; Dr. Clinton H. Thienes, professor of pharmacology, University of Southern California School of Medicine, Los Angeles; William A. Perlzweig, Ph.D., professor of biochemistry at Duke University School of Medicine, Durham, N. C.; R. J. Cowan of the Institute of Medicine and Veterinary Science of Adelaide, South Australia, and A. J. Llacer and J. C. Sozzi, who completed two months' study in ultramicrochemical analysis in Berkeley.

"Living High" at Northwestern

Eighty medical students of Northwestern University Medical School, Chicago, live on the sixth, seventh, eighth and ninth floors of the new twenty story student dormitory on the lake front at Huron Street, which is believed to be the tallest building in the



Abbott Hall

world used exclusively as a university dormitory. The new skyscraper is named Abbott Hall for Wallace C. Abbott, founder of Abbott Laboratories, and his wife, Clara A. Abbott, from whose estate Northwestern University received a gift of \$1,500,000 for use in medical, chemical and surgical research. Abbott Hall accommodates a total of 850 students on the Chicago campus of Northwestern, where the professional schools and the evening departments are located. Abbott Hall is Gothic in style, built of Indiana limestone, and each residential floor accommodates fifty-six students. The arrangements permit members of the fifteen fraternities, which previously had occupied temporary residences off the campus, to have a floor or part of a floor for their exclusive use. In the building are shops, libraries, dining rooms, lounges, squash courts, bowling alleys and a recreational roof garden. Across Lake Shore Drive, which the dormitory faces, is a new beach on Lake Michigan.

University of Georgia

The students and faculty at the University of Georgia School of Medicine, Augusta, joined in a social get-together, September 18, which was one of a series of meetings sponsored by the student-faculty council to promote a spirit of fellowship and cooperation.—A new hospital building, costing \$100,000, is to be constructed on the campus through the generosity of Judge S. Price Gilbert in memory of his father, Dr. Jasper Newton Gilbert, who graduated from the medical school in 1835.—Work has been completed on the improvements to the medical school library, made possible by a grant of \$10,000 from the Rockefeller Foundation and \$15,000 from an anonymous donor.

The Inaugural Session at Jefferson

Dr. Hobart A. Reimann gave the introductory lecture at the opening of the 116th annual session of Jefferson Medical College of Philadelphia, September 18. Dr. Reimann's subject was "Education of the Medical Student." The total enrolment at Jefferson this year is 513, of which 133 are members of the freshman class. All the freshmen completed four years of college work before they were admitted to Jefferson. They came from seventy-five different institutions from twenty-nine states, insular possessions and foreign countries, including Brazil, Korea, Iran, Puerto Rico and Hawaii.

Summer Clinic Service for Creighton Seniors

Creighton University School of Medicine, Omaha, inaugurated this year a summer clinic service for sections of the senior class, alternate thirds of the class spending about seven weeks of the summer in the clinic. The service proved highly satisfactory from the point of view of both students and teachers, and next summer it will be tentatively extended to the incoming junior students. Being relieved of didactic work during this period, the summer clinic service permitted the seniors to study each case more fully.

Medical History at Tulane

Charles W. Crumpton, sophomore at the Tulane University of Louisiana School of Medicine, New Orleans, was awarded the Rudolph Matas prize for the best paper on history of medicine at the annual banquet of the History of Medicine Society, May 15. Mr. Crumpton's paper was on Sir William Osler. Gilcin F. Meadors Jr., '40, was awarded the I. I. Lemann prize for his paper on Marion Sims.

Death of Dr. John McCrae

In the Student Section, September 28, it was said that Dr. John McCrae, Montreal, Canada, author of the poem "In Flanders' Fields," was killed in service during the first World War. It has been learned that Dr. McCrae died of pneumonia. J. C. Simpson, LL.D., the dean of McGill University Faculty of Medicine, Montreal, where Dr. McCrae was a member of the faculty, writes: "In the winter of 1917-1918 Lieutenant-Colonel McCrae was in charge of medicine in No. 3 General Hospital (McGill), C. E. F. at Boulogne. On the evening of January 23, word was received from headquarters that he had been appointed consulting physician to the First British Army Corps. The officer commanding his unit went to Colonel McCrae's quarters to offer congratulations but found him with a temperature around 99 F. and persuaded him to remain in bed till morning. The next afternoon definite signs of pneumonia began to develop and he was transferred next day to No. 14 British General Hospital for Officers. He rapidly sank, however, and died at 1:30 o'clock in the morning of Jan. 28, 1918."

Prizes Awarded at Temple

At the annual dinner of the graduating class and the medical alumni association of Temple University School of Medicine, Philadelphia, June 12, Dean William N. Parkinson awarded the following prizes to graduates and students for 1940:

Maurice L. Brown, the faculty prize, a gold medal for having attained the highest average during the four years course; the gynecology prize by Professor Hammond to the senior with the best record at the end of the course in gynecology; the proctology prize by Professor Hibshman to the senior for the best examination in proctology.

Clarence A. Holland, the alumni prize of \$25 to the senior passing the best examination for the year, provided the last three years of the course were taken at Temple.

Harold V. Harbold, the surgery prize by Professor Babcock to the senior giving the best written report of the surgical clinics for the year—a gold medal and \$50; the second prize, a silver medal and \$25, was given to Clarence A. Holland.

Gilbert Barron, the rhinology prize by Professor Ridpath to the senior passing the best examination in rhinology.

Robert J. Jahn, the otology prize by Professor Ersner to the senior passing the best examination in otology.

Harold I. Lecks, the urology prize by Professor Thomas to the senior passing the best examination in urology, and the C. V. Mosby Company prize to the senior with the highest average in medicine, a year's subscription to the *American Heart Journal*.

Jerry Zaslow, the dermatology and syphilology prize by Professor Wright to the senior presenting the best record in the course for the junior and senior years.

Mary Catherine Cortner, the hygiene and public health prize by Professor Hartley to the senior presenting the best sanitary and health survey of his home town.

David S. Ruhe, the senior surgery prize by Professor Babcock, a silver medal and \$25, to the junior presenting the best report of the junior surgical clinics for the year.

Milton M. Cahn, the junior obstetric prize by Professor Arnold.

John T. Ealy, the surgical procedures prize by Dr. J. N. Coombs to the junior presenting the best report on surgical procedures.

Charles B. Hess, the C. V. Mosby Company prize, one year's subscription to *Surgery*, for the highest average in surgery for the senior year.

University of Texas

Interest is being shown in the attempt to organize a medical school glee club at the University of Texas, Galveston, under the direction of Mr. Charles Spence, a sophomore.—William Mills has been elected president of the freshman class at the medical school, and R. V. Jones, president of the sophomore class.—An innovation in the curriculum for the senior students is a one week's externship in pediatrics at the Jeff Davis Hospital in Houston, which is required for credit in the course.—At the official opening of the school year, October 1, Dr. Raymond Gregory, newly appointed professor of pharmacology and medicine, was the principal speaker; his address dealt with the importance of laboratory courses in the medical curriculum, the value of wide reading on the part of the student and the rewards of scholarship.

Dr. Leake Lectures at Oklahoma

Phi Beta Pi at the University of Oklahoma is sponsoring an annual lecture known as the Leroy Long Sr. Lectureship. The first address was given, March 12, at the University of Oklahoma School of Medicine, Oklahoma City, by Chauncey D. Leake, Ph.D., professor of pharmacology at the University of California Medical School, San Francisco, on the "History of Anesthesia."

College of Medical Evangelists

Five alumni of the College of Medical Evangelists, Los Angeles, are sponsoring an organization including fifteen students each from the junior and the senior class to promote fellowship between the students and the alumni of the school. At the meetings held once every three weeks, a part of the time is given over to an informal talk by some prominent physician of southern California, the remainder being spent socially. It is hoped that other alumni will sponsor similar organizations.

A new laboratory building was completed last January to house the physiology, biochemistry, pharma-

cology and physical therapy departments. The old South Laboratory Building, which formerly housed these departments, has been taken over by the outpatient clinic. In the clinical division at the college, in order to correlate more closely the didactic work with the clinical clerkships, it is planned that instead of giving formal lectures the teachers will conduct round table discussions or conferences with small groups of students.

Columbia Awards One Hundred Scholarships

The 133d session of Columbia University College of Physicians and Surgeons, New York, opened, September 19, with 410 students enrolled, including 110 freshmen, who came from twenty-five different states and from forty-seven different colleges and universities. At the opening exercises, September 25, George W. Bachman, Ph.D., director of the School of Tropical Medicine, San Juan, Puerto Rico, gave an address on "Medical Research in Latin America."

The College of Physicians and Surgeons has awarded 100 scholarships totaling \$36,675 for the present academic year. Most of the scholarships awarded were amounts ranging from \$200 to \$500.

Student Officers at Tulane

Arthur J. Wallace Jr., '41, University of Tulane of Louisiana School of Medicine, New Orleans, has been elected president of the senior class for 1940-1941; John B. Tribble, vice president; Hugh Murphy Yearwood, secretary; Richard Baker Austin Jr., treasurer, and James Harvey Johnston Jr. and Samuel Gwin Robbins honor council members.

Musical Medical Society

Phi Mu Phi, an honorary musical medical society of the University of Illinois College of Medicine, Chicago, created in 1931, is said to be the only organization of its kind in a professional school in this country. It is composed of a concert orchestra, a men's glee club and a "swing band" and gives several public concerts and radio appearances during the year. Sponsored by members of the faculty, medical students are encouraged to try to associate themselves with the society. Phi Mu Phi, which was founded by undergraduate students, offers an excellent source of recreation and extracurricular activity.

Pennsylvania State Board Questions

The following questions were given by the Pennsylvania State Board of Medical Education and Licensure at the examination in Harrisburg, July 9, 1940:

PHYSIOLOGY, PATHOLOGY, BACTERIOLOGY AND PHYSIOLOGICAL CHEMISTRY

1. State what further laboratory tests would be indicated in each of three specific findings in a routine urinalysis.
2. Outline briefly the function of the liver.
3. What are the normal findings in a gastric analysis? Give the significance of each of the more common abnormal findings.
4. Outline the laboratory investigations called for in a case of edema.
5. What is the meaning and the significance of each of the following: (a) nystagmus? (b) reaction of degeneration? (c) aphonia?
6. Describe briefly the vasomotor system. How may it be seriously altered functionally? pathologically?
7. What is the physical consequence of a deficiency (a) in vitamin C? (b) in pituitary secretion in childhood?
8. Give specific directions for obtaining and for transmitting to the laboratory suitable specimens for determining the etiology (a) of purulent conjunctivitis; (b) of acute pharyngitis. What micro-organisms are suspected in each?
9. State the significant feature in bacteriologic investigation that identifies each of the following: (a) *tubercle bacillus*; (b) *Klebs-Loeffler bacillus*; (c) *Spirochaeta pallida*.
10. In a case of progressive debility without fever in a middle-aged man, what laboratory investigations might establish the cause?

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PUBLIC HEALTH ASPECTS OF RHEUMATIC HEART DISEASE

INCIDENCE AND MEASURES FOR CONTROL

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NEW YORK

Public recognition of the nature and requirements of the problems of rheumatic fever and rheumatic heart disease has lagged far behind the attention given to other diseases of less numerical and economic importance. Some reasons for this attitude are as follows: Because limited facilities compel those in charge of public health services to consider how they may best expend funds, other pressing problems offer better opportunities for effective control. Death-dealing epidemic diseases earliest required reporting because quarantine measures often limited their spread. Again, discovery of a specific etiologic agent is a factor in making a disease notifiable, witness the discovery of the tubercle bacillus; but a review of the history of notification of tuberculosis reveals how slow has been the attainment of our approximately exact statistical knowledge concerning this disease, which today is probably not more than 75 per cent accurate, at least in respect to morbidity. Even less exact is the information derived from reporting syphilis. With the remarkable acquisition of knowledge concerning syphilis in the first fifteen years of this century, it was obvious that it could be stamped out and society spared the necessity of providing for invalids with late syphilitic vascular, nervous and mental disease annually costing many times the outlay for efficient prophylaxis. Nevertheless prudence overcame prudence, and only recently has there been undertaken in this country what was possible from the scientific point of view twenty years earlier.

Another crippling disease might well be contrasted with rheumatic fever in its public health aspects, namely poliomyelitis. Both diseases in their early acute phases kill only a small portion of those affected; both cripple, one obviously, the other insidiously. In poliomyelitis, a single attack confers almost complete immunity, in rheumatic fever one attack apparently increases susceptibility to recurrences which induce progressive cardiac crippling, eventually leading to death. Knowledge concerning the virus causing infantile paralysis has not led to any effective therapeutic or prophylactic measures. While the number of symptom-free cases of poliomyelitis may be many times that of the crippling cases, the latter comprise only a fraction of the individuals suffering from rheumatic heart disease. The relative numerical prevalence of these two diseases can

be inferred from the following figures:¹ In New York City, during the ten year period 1930-1939, there were reported 7,811 cases of poliomyelitis with 693 deaths, but this includes the epidemic of 1931, with 4,138 cases and 504 deaths, and that of 1935, with 2,054 cases and ninety-one deaths. While there are no data available for the number of cases of rheumatic fever, in 1938 alone there were reported 147 deaths from rheumatic fever and 958 from rheumatic heart disease.² As indicated later, these figures are probably too low; nevertheless the mortality in a single year from rheumatic fever and rheumatic heart disease was almost double that of poliomyelitis for a whole decade. In other words, the economic importance of rheumatic fever is apparently much greater than that of infantile paralysis. The relative attention given them by the lay public, health authorities and vital statisticians is in striking contrast. Some idea concerning the occurrence of poliomyelitis can be gained from our public health reports, relatively little concerning the other because it is not reportable. And searching among the reported deaths from heart disease gives only an inkling of the relative part played by rheumatic fever because this well recognized etiologic factor has but recently been required on death certificates. When the desirability of reporting is urged, one encounters the objection of mistaken diagnosis both during illness and in deaths without postmortem examinations; but, in general, vital statistics, even with their recognized inaccuracies, are our most useful source of knowledge concerning the relative frequency and economic importance of various diseases and of the trends of increasing or decreasing incidence. Argument directed toward the desirability of attaining this information by requiring notification should not be regarded as fanatical. Even if the machinery cannot be all set in motion immediately it would be worth starting, for the two other great disabling chronic infections, tuberculosis and syphilis, are on the decline; and the existing institutions caring for patients with tuberculosis and late syphilitic nervous and mental diseases may in part be eventually devoted to the more effective rest treatment of patients with rheumatic heart disease. Had rheumatic fever been made a reportable disease twenty years ago, we could today present fairly accurate figures concerning the relative urgency of the problem and hence might better provide the technic whereby one class of invalids could be substituted for another.

With the requested reporting of rheumatic fever as an etiologic factor in death from heart disease, in New York City, some idea of the relative death-dealing effects of other infectious diseases and rheumatic fever may be obtained. In 1938³ there were 3,833 deaths from all forms of tuberculosis contrasted with 1,105 reported for rheumatic fever and rheumatic heart dis-

Second John H. Wyckoff Lecture for 1939-1940.
From the Hospital of the Rockefeller Institute for Medical Research.
Read before the New York University College of Medicine, Jan. 30, 1940.

1. Quart. Bull. New York Dept. Health 8:8 (Feb.) 1940.
2. Data furnished by Miss Claire Lingg, New York Heart Association.
3. Quart. Bull. New York City Dept. Health 8:9 (Feb.) 1940.

ease. Or contrast the mortality from rheumatic fever with that from the following reportable diseases in the same year: diphtheria twenty-six, measles forty-two, whooping cough 105, scarlet fever seventeen, epidemic meningitis fifty-three and poliomyelitis four, a total of 247.⁴ In other words, there was a ratio of 4.5 deaths from rheumatic fever and rheumatic heart disease to each death from all of these six reportable infectious diseases combined. Hedley⁴ reported a mortality ratio of 3.6 to 1 for the same diseases in Philadelphia in the year 1936. These figures are presented not with the idea of doing less with the required reportable diseases but of emphasizing the relatively greater size of the rheumatic fever problem and the consequent desirability of also making this disease notifiable.

STATISTICS OF NEW YORK HEART ASSOCIATION

The lack of approximately reliable data from the Bureau of Vital Statistics of New York City until recently has fortunately not left us entirely without some other means of estimating the size of the problem, because the New York Heart Association for more than

enough active rheumatic carditis to require special clinic care. This, however, is only part of the story among sick rheumatic children, for there were a total of 7,759 children treated by these clinics, including new cases, readmissions and old cases. If we apply the modest figure of 66 per cent as the proportion of these patients who probably had rheumatic fever as an etiologic factor in their illness, we see that at least 5,000 children were in need of supervision because of rheumatic heart disease in these clinics alone.

While this case load for children is impressive, it is obviously much less than the total imposed by rheumatic fever, first because many cardiac children do not enter these clinics and second because the long periods of invalidism due to rheumatic heart disease usually come later in life. This is illustrated by the data for 2,430 adults admitted for the first time to these clinics in the year 1938. Among these the etiologic factor was definitely given as rheumatic fever in 715, or 29 per cent, and unknown in an additional 8.1 per cent. Combining the new admissions of both children and adults, it is seen that this disease made approximately 37 per cent of the case load in new cases in this four year period with an additional 11 per cent in the unknown category. It seems safe, therefore, to consider 45 per cent as a safe estimate of new patients applying to these clinics for care whose heart disease rested on a rheumatic basis. If we apply the estimate of 45 per cent to the total cases on the active roster of these clinics, it appears that at least 8,700 were of rheumatic origin. The exact number of these patients who were suffering from active rheumatic inflammation of the heart valves and muscle compared with disability due to scarring, and simple hypertrophy and dilatation is a matter of conjecture, but that it was several thousand can be safely stated for the following reasons: Only exceptionally do children with rheumatic heart disease have symptoms of cardiac failure without active rheumatic disease. One may therefore take it that such a child needs the type of treatment that will help him overcome a chronic infection, as well as therapeusis for relieving the signs of cardiac insufficiency. While the element of active infection may not be playing a role in inducing symptoms among so high a proportion of adults, because by this time scarring of the tissues and wearing out of a long overworked mechanically subnormal organ are important factors in cardiac failure, still the baleful influence of active rheumatic disease in adults is well known. For example, careful microscopic examination of the hearts of rheumatic subjects dying from chronic heart disease has revealed evidence of active rheumatic inflammation in the organs of from 70 to 80 per cent of those under 40 years of age.⁶ While figures are not at present available concerning the age grouping of the eight to nine thousand clinic patients with rheumatic heart disease, it is a well recognized fact that relatively few outpatient clinic patients fall into the old age groups. By applying this knowledge to our analysis of the problem of rheumatic infection among the more than 19,000 cases of heart disease seen in these fifty-six clinics in a single year, 1938, it is obvious that in many thousand of them active rheumatic infection was playing an important role in inducing invalidism.

TABLE 1.—New Cases of Rheumatic Heart Disease Admitted to Cardiac Clinics of the New York Heart Association, 1935-1938

Year	Clinics	New Cases			Etiology Rheumatic Fever		Etiology Unknown		Rheumatic Fever and Unknown	
		Children	Adults	Total	No.	Per Cent	No.	Per Cent	No.	Per Cent
1935	50	1,382	2,529	3,911	1,588	40.6	508	13.0	2,096	53.6
1936	53	1,172	2,463	3,635	1,313	36.1	438	12.0	1,751	48.1
1937	54	1,256	2,364	3,620	1,390	38.4	397	11.0	1,787	49.4
1938	56	1,332	2,732	4,064	1,506	37.0	430	10.6	1,936	47.6
1936	24	1,022	.....	.....	513	50.1	217	21.2	730	71.3
1937	24	1,074	.....	.....	585	54.4	180	16.8	765	71.2
1938	25	1,031	.....	.....	606	58.7	183	18.1	794	76.8
1936	23	.....	2,219	.....	623	35.5	183	12.2	808	47.7
1937	24	.....	2,136	.....	603	35.3	181	11.8	786	47.1
1938	22	.....	2,440	.....	715	29.3	193	8.1	913	37.4
Children and Adults										
1936	6	.....	394	.....	175	44.5	58	15.0	233	59.5
1937	6	.....	410	.....	200	48.7	36	8.8	236	57.5
1938	6	.....	369	.....	178	48.2	38	10.3	216	58.5

twenty years has gathered statistics from the patients in the various cardiac clinics which met the minimal requirements of that association. There are now fifty-six such clinics, where the diagnosis follows a uniform plan laid down in the official criteria; hence the data are probably more accurate than any gathered by compulsory notification. The admission figures for four years are shown in table 1.⁵

In 1938, among 1,031 children admitted to twenty-five children's cardiac clinics, 59 per cent had a definite diagnosis of rheumatic heart disease and in another 18 per cent the diagnosis was unknown. All students of this disease recognize that a fair proportion of patients with rheumatic carditis have no other outstanding symptoms of rheumatic fever; hence a rate of 76 per cent of rheumatic heart disease among this 1,031 new cases seems a very conservative estimate. The actual number was 794. In the same year 126 other children who had been previously discharged were readmitted; probably most were suffering from recurrences of rheumatic heart disease severe enough to require medical attention. In children these relapses are indicative of reactivation of the rheumatic inflammation in the heart muscle and valves, so it seems safe to add 100 to the 794, or a total of at least 900 who were admitted to these twenty-five outpatient children's clinics with

4. Hedley, O. F.: Mortality from Rheumatic Heart Disease in Philadelphia During 1936. *Pub. Health Rep.* 52:1907 (Dec. 31) 1937.
5. Data compiled from summary of clinic reports, New York Heart Association Committee on Cardiac Clinics.
6. de la Chapelle, C. E.; Graef, Irving, and Rottino, Antonio: Studies in Rheumatic Heart Disease: An Analysis of One Hundred and Nineteen Hearts with Special Reference to the Relationship of Auricular Fibrillation to Mitral Valvular Deformity and Certain Rheumatic Tissue Changes. *Am. Heart J.* 10:62 (Oct.) 1934. Rothschild, M. A.; Kurch, M. A. and Gross, Louis: Incidence and Significance of Active Infection in Cases of Rheumatic Cardiovascular Disease During the Various Age Periods: Clinical and Pathological Study. *Am. Heart J.* 9:586 (June) 1934.

Special attention has been given to these only approximately correct data because they represent the results of study by a well qualified group of physicians; they include only living patients and hence indicate somewhat the size of the facilities required for the adequate care of these patients, if we regard as good practice provision for prolonged and supervised rest, proper nutrition,

TABLE 2.—Position of Heart Disease Among First Three Causes of Death in New York City and New York State in 1938

Age	Males		Females	
	New York City	Rest of State	New York City	Rest of State
5-14.....	2d	X	1st	1st or X
15-19.....	1st	2d	2d	3d
20-24.....	2d	2d or 3d	2d	3d
25-34.....	3d	2d or 3d	2d	3d
35-39.....	2d	2d	2d	2d
40-44.....	1st	1st	2d	2d
45-59.....	1st	1st	1st or 2d	1st or 2d
60-74.....	1st	1st	1st	1st
75-84.....	1st	1st	1st	1st
85 and over.....	1st	1st	1st	1st

X Not included in list of first three causes.

and guarding against such infection as apparently set off the rheumatic explosion. They by no means include all the patients in New York City who probably require professional care because of rheumatic heart disease nor do they represent the total case load imposed by rheumatic fever, which in the acute and subacute stages forces bed rest on many of its victims; although, let it be mentioned parenthetically, the practice of relieving with drugs a rheumatic patient of his painful and rest-imposing symptoms and then allowing him to become ambulatory has by no means become antiquated. The necessity for providing beds for other more acutely ill patients often causes hospital authorities to urge the removal of the symptom-free rheumatic fever patient to his home or to the outpatient department when good practice indicates prolonged bed rest. The average child with his first or second attack of rheumatic fever often has little and only transitory arthritis and is usually free from any symptoms of heart involvement even though there are physical and laboratory signs of active carditis. Were adequate and properly organized sanatoriums available for these patients, it is doubtful whether they should be kept long in general hospital wards, because it is difficult to maintain adequate disciplinary and recreational facilities and provide against reinfection with streptococci, which may induce a serious relapse. In other words, under existing organizations a patient who requires chronic treatment is placed under conditions in which acutely ill individuals receive special attention. Certainly, transfer to outpatient care is not the proper answer to his requirements, and yet in many instances this is the only way of meeting the demands imposed by a large number of patients of all classes.

OTHER SOURCES OF INFORMATION

Because size, both relative and absolute, is one of the important factors which accentuate the urgency of any public health program, it seems worth while to explore further the sources of available information. Because no etiologic data are recorded in the official lists of death from heart diseases, if one is to obtain any idea of the approximate number of deaths in which rheumatic fever has had an important role in the ultimate fate of the decedents one must use some such device as applying etiologic interpretation gained from studies of large groups of cardiac patients of all classes and ages.

While heart diseases in general have become the leading cause of death, and obviously most of these fatalities occur among older people, nevertheless in the age periods 5 to 30, when rheumatic fever provides the chief etiologic background for the heart failure, heart disease stands very prominent among the three most important causes of death in both New York City and State, as is illustrated in the figures abstracted in table 2.⁷ Such official figures indicate most clearly how important it is not to relegate the interest in heart diseases entirely to the field of geriatrics.

While it is generally recognized that rheumatic fever plays the chief etiologic role in cardiac deaths in the age groups 5 to 30, it is desirable to gain some impression as to its relative importance later in life. For this purpose one may interpret in more detail the official lists of death with knowledge gained from etiologic analysis of large groups of living cardiac patients. Among the most reliable data in this respect for an analysis of New York vital statistics are those of Wyckoff and Lingg⁸ because they include patients from hospital wards, outpatient clinics and private practice. If one applies such distribution coefficients to the cardiac deaths in New York State in 1938, included under the categories 90 to 95 of the 1929 International List of the Causes of Death, and further subdivided according to decades, one obtains the figures shown in table 3.⁹

Some interesting points emerge from such a tabulation. In recent years the emphasis laid on the prevalence of rheumatic heart disease among children and of degenerative cardiovascular disease in the aged has diverted our attention statistically away from the influence of rheumatic fever as a cause of cardiac disability in the fourth and fifth decades; and yet, if the figures shown are approximately correct, rheumatic heart disease takes a larger toll in the second half of life than in the first. Such an impression is strengthened by the reported deaths from rheumatic heart disease in New York City for the same year.² Among these 958 deaths 377, or 39 per cent, were in subjects under 30, 411 in

TABLE 3.—Total Number of Deaths, Categories 90-95, New York State in Age Groups 1-59

Age, Years	New York State (Excluding New York City)		Per Cent *	Estimated Number Dead of Rheumatic Heart Disease		
	New York City	New York City		New York City	New York State	Total
Under 5	16	51				
5-9	72	113	90	65	102	167
10-19	277	424	82	227	348	575
20-29	403	600	75	302	450	752
30-39	751	1,138	58	436	669	1,066
40-49	2,327	3,787	29	675	1,098	1,773
50-59	4,539	7,714	9	409	694	1,103
				2,114	3,352	5,466

* Percentage estimated on distribution of rheumatic fever as etiologic factor of heart disease in various age groups by Wyckoff and Lingg.

those between 30 and 59, and seventy in patients over 60 years of age; but this does not include those reported as dying from rheumatic fever. Hedley⁴ has made special reference to the importance of rheumatic heart disease as a cause of death in the latter half of life because he found in Philadelphia during 1936 that only 40 per cent of decedents from this affliction fell in the

7. Abstracted from table on page xl of Fifty-Ninth Annual Report of the New York State Department of Health, 1938.

8. Wyckoff, J., and Lingg, Claire: Statistical Studies Bearing on Problems in the Classification of Heart Diseases: II. Etiology in Organic Heart Disease, *Am. Heart J.* 1: 446 (April) 1926.

9. Abstracted from tables 18 and 19, pp. 46-49, Fifty-Ninth Annual Report of the New York State Department of Health, 1938.

first three decades of life. DeGraff and Lingg's¹⁰ analysis of a large group of fatal cases with rheumatic fever as the background for the crippled heart showed definitely that the fourth decade contains many fatal cases; and among Wyckoff and Lingg's⁸ living patients in the sixth decade almost 30 per cent could attribute to rheumatic fever an etiologic role in their heart disease.

The difference between the number of deaths in New York City, estimated in table 3, 2,114, and the 958 reported as due to rheumatic heart disease, obviously requires some discussion. An additional 147 deaths were reported as due to rheumatic fever, which immediately raises it to a total of 1,105. Moreover, the figure 2,100 does not seem out of line with data derived from the case load imposed by rheumatic heart disease in the New York Heart Association cardiac clinics in 1938. As already mentioned, between 7,000 and 8,000 patients seen in that year were reasonably certain to have had rheumatic fever as a cause of their disability. DeGraff and Lingg¹⁰ found an average of three years between the onset of heart failure and the final episode; in other words, each death might be considered to represent an average of three years of invalidism of a degree that would cause the patient to seek medical assistance. Applying the factor 3 to the total of 2,100 estimated deaths would give an invalidism rate of 6,300, which is less than the number of patients with rheumatic heart disease seen in the New York Heart Association clinics alone; for to this number should be added those in other clinics, private patients and those who because of marked disease were no longer ambulatory. The total estimate in table 3, therefore, seems conservative, even though the age distribution may be inaccurate.

In order to determine the probable size of the rheumatic fever and rheumatic heart disease problem for the entire country, some other statistics must be considered. Hedley¹¹ has recently presented data indicating that the incidence of rheumatic fever is declining. This is based on the thesis that the number of deaths in the age groups 5 to 24, classified under categories 90 to 95 in the International List of Causes of Death of 1929, or of categories 87 to 90 of the 1920 list, might be considered a valid index of the incidence of rheumatic heart disease and that changes in the rates per hundred thousand based on this index could be used as a basis for indicating the trends as to the incidence of rheumatic heart disease. Much valuable information, presented in Hedley's paper, will be discussed later. That the total deaths from heart disease in the age period 5 to 24 has rheumatic fever as a background in most instances is obvious, but it is equally obvious from both clinical and pathologic experience that the total deaths in this age group by no means represent the total deaths brought about by rheumatic fever. Indeed, Hedley⁴ earlier emphasized the importance of rheumatic heart disease as a cause of death in the last four decades of life. In New York State during the year 1938 one finds from table 3 that among the estimated 5,500 deaths from rheumatic heart disease there occurred 1,494, or 28 per cent of the total, within the first three decades. If one includes only the cardiac deaths in the age group 5 to 24, the total was 1,129, or roughly 20 per cent of the total estimated as due to rheumatic carditis. If

this ratio holds for the entire United States, it would seem that the total deaths from rheumatic heart disease for the year 1936 would be five times the 6,321 reported by Hedley as occurring in the age group 5 to 24 inclusive, or 31,600. If we further apply to this total the factor of 15, the average number of years that DeGraff and Lingg¹⁰ found to elapse between the onset of rheumatic fever and fatal heart disease, we could estimate that there were about 460,000 persons in the United States whose hearts had been damaged as a result of rheumatic fever. Paul,¹² from a study of the incidence of valvular heart disease among school children, drafted men, hospital patients and insured persons, estimated that the total number of cases of rheumatic heart disease in a population of 100 million would be about 840,000; this rate applied to the present population of the United States would give about 1,100,000 cases. As this is more than double the number I have estimated from mortality rates, it seems that my estimate is probably not too large. Another check on my estimates might be derived from the annual death rate from valvular heart disease among policyholders of the Metropolitan Life Insurance Company reported by Dublin and Lotka;¹³ for the year 1930 that rate was 45 per hundred thousand. This, applied to a population of 130,000,000, would give a total of 58,500 deaths a year from valvular heart disease, a figure nearly double that derived from my estimates. This multiplied by 15 would indicate almost 900,000 cases of valvular disease and if, as seems probable, higher rheumatic fever rates existed in the 1920s, the total would easily be raised to a million, for let it be emphasized that the rheumatic fever of ten to twenty years ago is having an influence on the rate of cardiac deaths today.

CLIMATIC INFLUENCES ON INCIDENCE OF RHEUMATIC HEART DISEASE

Among the factors that have received much attention in the etiology of rheumatic fever are the geographic conditions under which the disease appears to wax or wane. These are naturally important in considering public health aspects of rheumatic heart disease, for the chronic and relapsing nature of the infection furnishes an ideal setup for testing the influence of various environments, could it be confidently stated that some offered probability of arresting its progress.

A striking feature of the rheumatic infection in this latitude is the seasonal variation, with the highest incidence in late winter and spring; but when summer comes fewer new cases occur, and those with acute symptoms improve. This indicates that a tropical environment might explain the phenomenon, were similar seasonal influences not seen in a more northern area such as London, where a really hot day is rare. There, however, the low point on the incidence curve corresponds with the combination of greatest amount of sunshine, highest mean temperature and lowest moisture.¹⁴

The many surveys indicating the rarity of the disease in the tropics and subtropics and the lower incidence reported in our own Southern states have suggested the importance of climate to such an extent that some people think that all they require to be cured is to move to Florida or California. In view of these opinions it becomes necessary to investigate the available data more closely. The most encouraging reports were those

10. DeGraff, A. C., and Lingg, Claire: The Course of Rheumatic Heart Disease in Adults: I. Factors Pertaining to Age at Initial Infection, the Development of Cardiac Insufficiency, Duration of Life and Cause of Death. *Am. Heart J.* 10: 459 (April) 1935.

11. Hedley, O. F.: Trends, Geographical and Racial Distribution of Mortality from Heart Disease Among Persons 5-24 Years of Age in the United States During Recent Years (1922-1936), *Pub. Health Rep.* 54: 2271 (Dec. 29) 1939.

12. Paul, J. R.: The Epidemiology of Rheumatic Fever, *American Heart Association, New York, Metropolitan Life Insurance Company, 1930.*

13. Dublin, L. I., and Lotka, A. J.: Twenty-Five Years of Health Progress, New York, Metropolitan Life Insurance Company, 1937.

14. London County Council Annual Report 3: 40 (part 2, Public Health), 1937.

of Coburn,¹⁵ who moved a few children with chronically active rheumatic fever to Puerto Rico and noted complete subsidence of symptoms, with recurrence of active carditis when the patients had resumed their residence in New York. Jones and his co-workers¹⁶ noted similar improvement in a group of children sent from Boston to Miami for one season, but the results were subsequently less encouraging. One might remark, parenthetically, that the climate of Miami is far from tropical and that numerous fresh respiratory infections are transported from the North to that city daily during the winter. The factor of respiratory infection is therefore not eliminated by a possibly favorable geographic site.

Several communications have appeared in recent years indicating that rheumatic fever may not be so rare in the tropics as might be implied from the reports of Tertius Clarke¹⁷ and others. The coastal borders of southern India and Ceylon are about as tropical as any regions inhabited by man, but Fernando¹⁸ and Stott¹⁹ have found a fairly high incidence of rheumatic heart disease among the natives, with the same relative differences in incidence among the poor and well-to-do as is seen in New York and London. Indeed, crowding, poor housing and poor nutrition seem to play almost as important unfavorable roles in hot as in cold climates. The type of clinical manifestations of rheumatic fever under different climatic environments must be considered in judging the reports from different localities. In this country many clinicians have noted the relative infrequency and mildness of polyarthritis in the South, compared with the Northeastern Seaboard. Stott¹⁹ emphasizes the necessity of estimating the incidence of rheumatic fever in India from the occurrence of mitral valvular disease rather than from that of migratory polyarthritis. On the other hand, the influence of climate seems to be strikingly brought out by such investigations as that of Paul and Dixon²⁰ among three large groups of American Indian children living in different latitudes. Even though of analogous anthropologic stock, with housing conditions not dissimilar, those living in southern Arizona had only about one tenth as much mitral valvular disease as those in Idaho and Montana.

Any large survey, then, that will throw light on the influence of climate is welcome. Hedley's¹¹ recent report presents an analysis of the cardiac deaths among decedents between the ages of 5 and 24 over the period 1922 to 1936 and covers the entire United States. The value of these data rests on the approximately correct assumption that most of the cardiac deaths in this age group have rheumatic fever as a basis. A perusal of these data shows the difficulty of judging correctly the influence of such a simple factor as climate, for we immediately meet the complicating factors of urbanization, race and economic status of the inhabitants; and in the state of Florida, for example, one must consider the probability that during the past two decades many cardiac invalids have migrated from less salubrious climates.

The first serious factor in the analysis of the crude figures is the relatively greater death rates among Negroes compared with white persons. For example, among the twenty cities having the highest rate in the three years 1930-1932 the Southern states include three, namely Jacksonville, Memphis and El Paso; but, when the data for these three are separated into white and colored groups, the rates for white persons fall far below that for the colored. Again, if we pick the cities of 100,000 or more with a rate of 10 or less per hundred thousand among the white population, we find that here the rate among Negroes is from two to four times as high. One may legitimately ask whether these differences are due entirely to racial factors or in part to such economic elements as poor food, housing and clothing. An interesting commentary on the relative influence of climate and economic status is furnished by the rates in Boston, 31.3, Somerville, 16, and Cambridge, 11.8 per hundred thousand, respectively,

TABLE 4.—Mean Annual Death Rate per Hundred Thousand from Heart Disease (Categories 90-95) in Age Groups 5-24 Years, 1930-1932²¹

Twenty Highest Rates	Total	White	Colored
Buffalo.....	40.3	....	....
	34.6	....	....
	34.3	33.3	45.0
	33.6	....	....
Boston.....	31.3	....	....
Paterson.....	29.8	....	....
Seranton.....	28.5	....	....
Danver.....	28.4	....	....
	28.0	....	....
	28.0	27.2	45.0
Fort Wayne, Ind.....	27.7	....	....
Chicago.....	27.2	23.8	41.6
Washington, D. C.....	26.4	21.2	38.7
	26.3	....	....
	26.1	13.8	45.4
	25.9	....	....
	25.7	25.1	31.2
	25.3	....	....
El Paso.....	25.0	9.3	88.4
Memphis.....	25.0	10.3	39.7
White Rate 10 or less per 100,000			
El Paso.....	25.0	9.3	88.4
Houston.....	11.9	9.9	17.2
Fort Worth.....	10.6	8.6	20.9
Dallas.....	10.5	6.5	28.9
New Orleans.....	17.8	10.4	35.5
Atlanta, Ga.....	20.9	8.5	42.9
Miami, Fla.....	10.1	8.5	13.5
Richmond, Va.....	15.0	9.2	28.2

in the years 1930-1932. The climatic environment in these three contiguous Massachusetts cities is essentially the same but the economic conditions differ. The differences in the rates of deaths probably due to rheumatic heart disease in the white and colored races, respectively, is further emphasized by an analysis of Hedley's data for the Southern states during the period 1922-1929, where the rates among Negroes were two to three times that for white persons.

Even considering the combined rates for white and colored, a favorable effect of the southern climate can be inferred from these tables, for when one compares the rate among white persons in the various states of the South with that for the entire population in the northernmost states, the balance is in favor of the Southern states in practically every instance. Again, comparison of the rates in the northern tier of states with those of the southernmost yield additional interesting information (table 6). The rate for Maine is lowest of any in its tier and as low as that among the white population of Virginia, Kentucky or Florida. The rate for Vermont is almost as low; while New Hampshire, situated between these two, has a distinctly

15. Coburn, A. F.: The Factor of Infection in the Rheumatic State, Williams & Wilkins Company, Baltimore, 1931.

16. Jones, T. D.; White, P. D.; Roche, C. F.; Perdue, J. J., and Ryan, H. A.: The Transportation of Rheumatic Fever Patients to a Subtropical Climate, J. A. M. A. 109:1308 (Oct. 16) 1937.

17. Clarke, J. T.: The Geographical Distribution of Rheumatic Fever, J. Trop. Med. & Hyg. 33:249 (Sept. 1) 1930.

18. Fernando, P. B.: Rheumatic Heart Disease as Met with in Hospital Practice in Ceylon, Quart. J. Med. 8:261 (July) 1939.

19. Stott, H.: On the Necessity of Teaching the Frequency of Rheumatic Infection in Young Indians, Indian M. Gaz. 73:330 (June) 1938.

20. Paul, J. R., and Dixon, G. L.: Climate and Rheumatic Heart Disease: A Survey Among American Indian School Children in Northern and Southern Localities, J. A. M. A. 108:2096 (June 19) 1937.

21. Tables 4, 5 and 6, material abstracted from Hedley's tables.

higher rate, possibly because of a larger industrialized population. The three northern tier states with the largest urban population, New York, Ohio and Michigan, had by far the highest rate; then in the rest of the northern tier with the exception of Montana the rate is practically the same as that of New Hampshire. Montana must be classed among the mountain states where

Mountain states should probably be avoided by sufferers from this disease, if they are searching for the most beneficial climate.

SANATORIUM THERAPY OF RHEUMATIC
HEART DISEASE

While the nature of rheumatic fever and rheumatic heart disease and the size of the problem have long appeared to make it amenable to public health consideration, as far as can be learned, only in London have extensive provisions been made for the care of the majority of rheumatic children. In many of our cities the school authorities have provided facilities for education, transportation and school room environment specially arranged for children with heart disease. Special cardiac outpatient departments, often supervised by local heart association specialists, attempt to furnish medical care for these children; and in a few cities there are good convalescent homes largely supported by private philanthropy, with private physicians in attendance. All of these efforts, however, have apparently only scratched the surface. It is fortunate, therefore, that we have had one large scale example of how the problem might be attacked; and there are also some data indicating favorable results from this experiment, which is being conducted in London.

The London County Council's Rheumatism Scheme has been slowly developed since 1926.²⁴ Fundamentally it is based on two theses: first, that rheumatic fever is a chronic infection and hence its victims should receive adequate chronic treatment; and, second, that the relapsing nature of rheumatic fever and the consequent heart disease demand supervision over many years. It is a cooperative effort on the part of the school and health authorities, which have enlisted under their supervision the public and private institutions already organized for the care of rheumatic children; and in addition there have been built, outside of London, special units containing a total of 900 beds for hospitalizing all cases of rheumatic fever, chorea or active rheumatic heart disease in school children under

TABLE 6.—Comparison of Mean Annual Death Rate per Hundred
Thousand from Heart Disease (Categories 87-90) in
Age Groups 5-24 Years, 1922-1929, in Northern-
most and Southernmost Tiers of States

Northern Tier		Southern Tier	
Maine.....	10.5	Florida.....	11.4
New Hampshire.....	14.2	Alabama.....	7.8
Vermont.....	11.9	Mississippi.....	6.9
New York.....	29.7	Louisiana.....	7.1
Ohio.....	18.0	Texas.....	8.5+
Michigan.....	20.7	New Mexico.....	16.0
Wisconsin.....	14.4	Arizona.....	14.0
Minnesota.....	14.7	California.....	16.0
North Dakota.....	12.8		
Montana.....	19.5		
Washington.....	15.4		
New York (total) 29.7		New Jersey 28.9	Pennsylvania 24.9

16 years of age for at least six months. This has required a minimum of one bed to 550 school children.²⁵ The working of the scheme is best illustrated in the chart of the organization. The center is the rheumatism section in charge of a full-time medical officer with an adequate staff; through this section all applications for admission to the special hospital units pass. There are two types of units, one for active cases and the other for convalescent children who have recovered from

TABLE 5.—Mean Annual Death Rate in Southern States per
Hundred Thousand from Heart Disease (Categories
87-90) in Age Groups 5-24 Years, 1922-1929

	Total	White	Colored
Maryland.....	21.2	19.7	27.5
District of Columbia.....	25.4	19.3	41.0
Virginia.....	13.7	10.8	20.7
West Virginia.....	11.3	.....	.....
North Carolina.....	12.4	8.8	20.0
South Carolina.....	15.5	8.7	22.1
Georgia (2 years).....	13.0	8.3	20.2
Florida.....	15.0	11.4	22.5
Kentucky.....	11.1	10.2	20.9
Tennessee.....	10.7	8.9	18.8
Alabama (5 years).....	12.0	7.8	19.0
Mississippi.....	11.0	6.9	14.8
Arkansas (3 years).....	8.9	7.4	13.3
Louisiana.....	12.6	7.1	21.3
Oklahoma (2 years).....	9.0	8.5	12.7
Texas (4 years, 1933-1936).....	6.8	.....	.....

Hedley found the highest rate. Indeed, Utah leads all the states with a rate of nearly 35 per hundred thousand; and the Mountain states as a group with a rate of 22.6 were exceeded only by the group of Middle Atlantic states New York, New Jersey and Pennsylvania, where the rate was 27.6. As Arizona and New Mexico had distinctly the lowest rate of any mountain state, a southern latitude again appears to exert a favorable influence.

With minor variations, a trend in incidence of fatal heart disease in the age groups 5-25 has been steadily downward over the past two decades; and this tendency is in line with that noted by Atwater,²² by Cohn²³ and by Dublin and Lotka.¹³ It is interesting to see that the percentage fall has been less in those Southern states where the rate is low, such as Alabama and Mississippi; but there the high rate among Negroes did not drop in the last decade; and in the South Atlantic states, where there was an appreciable fall of the rate among the white people during this period, that among the colored was stationary or rising. It must be mentioned, however, that the fall in the death rate from heart disease in the age group 5-25 does not prove definitely that there has been a corresponding fall in the incidence of either rheumatic fever or rheumatic heart disease, because, as already mentioned, this age period comprises only a fraction of all the cardiac deaths resulting from rheumatic fever; and possibly better treatment has lengthened the life expectancy of patients with rheumatic heart disease so that the fatal outcome may not be manifest until later age periods. Such, indeed, has been the result of modern therapy in diabetes; but even if Hedley's analyses indicate no more than that, such an encouraging gain is well worth recording.

In summary, then, Hedley's data indicate that at least two environmental conditions are operative and should be considered, namely climatic and economic. The Southern states appear to furnish the most favorable environment for patients with rheumatic heart disease or at least the least favorable environment for its development, while the Middle and Northern

22. Atwater, R. M.: Studies in the Epidemiology of Acute Rheumatic Fever and Related Diseases in the United States, Based on Mortality Statistics. *Am. J. Hyg.* 7: 343 (May) 1927.

23. Cohn, A. E.: Heart Disease from the Point of View of the Public Health. *Am. Heart J.* 2: 275-301 (Feb.), 386-407 (April) 1927.

24. Thornton, C. E.: The London Scheme for the Treatment and Supervision of Juvenile Rheumatism. *Acta rheumatol.* 9: 10 (May) 1937.

25. Thornton, C. E.: Personal communication to the author.

recent attacks. On discharge from these hospital units the patients again pass through the rheumatism section, which assigns the child to the educational category its physical state requires and also to the proper medical supervisory authorities. In this rheumatism section there is a register of each child reported as suffering or having suffered from rheumatism and this is used to supervise and record his treatment until he is 16; and for those patients who have received institutional care under the scheme there are more complete records which are available for reference until the patient attains the age of 18. Physicians in supervisory centers situated either in the schools, in private hospitals or in outpatient clinics supported by the scheme examine these patients often enough to detect recrudescence of rheumatic fever even though of slight degree; and in such instances the patient is referred again to the proper institution for treatment. These institutions are essentially hospitals or sanatoriums with both medical and educational staffs, for it is realized that suitable education and special training of these patients are important elements in their treatment. The individual hospital units have all physical provisions necessary for good medical care, including outdoor treatment in bed when that is advisable. The home conditions of all active cases are investigated, and where obviously inadequate or unfavorable, a report is submitted to proper authorities with the object of having these families better housed.

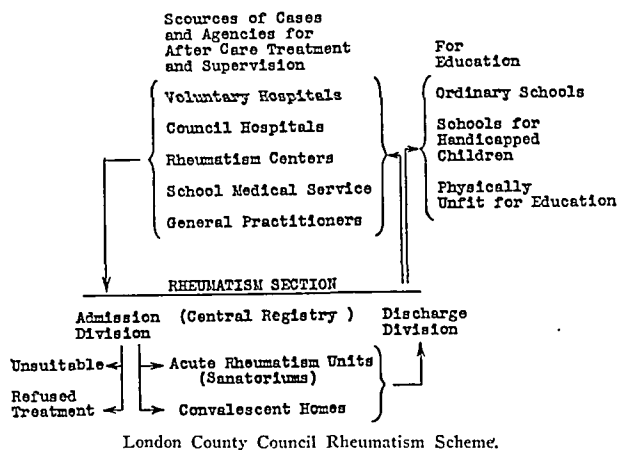
Physicians who have followed rheumatic children for the past fifteen or twenty years feel that the expense of the scheme has been justified by the statistical results. In 1926, for example, 2 per cent of the school children of London were suffering from acquired heart disease, while in 1936 the incidence had fallen to 0.8 per cent. Furthermore, the number of children of school age whose chronic cardiac crippling was of such severity as to require care in special educational units during a four year period has dropped steadily as follows: 1934, 320; 1935, 232; 1936, 153; 1937, 114.²⁶

In urging the importance of providing similar facilities for the chronic care of patients with rheumatic heart disease, one often meets the objection that we cannot judge accurately the benefits of sanatorium therapy because we have no large series of untreated patients for comparison. One might reply that practically all studies and statistics concerning the life history of rheumatic heart disease deal largely with patients who fall naturally into such a control group because they have had relatively little institutional treatment. On the other hand, even admitting the desirability of a simultaneously observed noninstitutionalized control group made up of rheumatic children of similar age and severity of carditis, it appears probable that such a striking diminution in the incidence of both rheumatic valvular disease and of crippling carditis as has been observed in London might properly be attributed to the measures so extensively provided for prolonged treatment of children with active or recent rheumatic fever.

PROBABLE SANATORIUM REQUIREMENTS FOR RHEUMATIC CHILDREN IN NEW YORK CITY

As already noted, London is the only large city which has attempted to provide care for rheumatic children on an extensive scale; and as the scheme there elaborated has been slowly developed, it probably

rests on a sound basis. Doubtless the present war has disrupted its working seriously, but it has been operative long enough to serve as a model. It therefore might be profitable to compare the facilities in New York for meeting a similar problem. If provision for hospitalization should be made at the same rate as that existing for the London school population under 16 years of age, i. e. one bed for 550 children, 1,760 beds would be needed. In 1934, 2,181 children under 14 years of age with heart disease were discharged from the hospitals of New York City; among them 1,441, or 66 per cent, were kept in the wards less than one month and another 414, or 19 per cent, were in the wards between thirty-one and sixty days.²⁷ As the majority of these 1,855 children were doubtless suffering from active rheumatic carditis, it is obvious that the case load here requiring the type of treatment furnished in London was as large as existed in that



city. Moreover, the large group of children with simple rheumatic fever or chorea were not included, nor were those seen only in outpatient clinics enumerated. For the special care of more than 2,000 children there were 187 beds, but in only one of the institutions, Irvington House, were physicians in residence and adequate facilities available for the complete study of infectious and cardiac activity. Subsequently the St. Francis Sanatorium for Cardiac Children has been established at Roslyn, Long Island, with recent plans for enlarging its capacity to 125 beds. Therefore about 300 beds are now available to meet a situation probably demanding from three to five times as many for children alone. The New York Heart Association cardiac clinics are probably as well organized as the London supervisory centers, and in many of them the technic for following the natural history of rheumatic heart disease is much better. New York City has special school classes for physically handicapped cardiac children and provisions for their transportation. What we lack is a central rheumatism section comparable to that in London and the provision for adequate sanatorium care. A central registry for these patients is obviously desirable, for only by analysis of records of rheumatic patients such as would be compiled by such a system will it eventually be possible to determine the relative efficacy of different treatments. The New York Heart Association has not been unmindful of the importance of compiling such records, and its Research Committee has many thousand under accumulation and analysis. But the effective study of such data should not rest on the efforts and

26. London County Council Annual Report 3:44 (part 2, Public Health), 1937.

27. Facilities in New York City for the Care of Patients with Heart Diseases, New York Heart Association, 1936, p. 16, table 5.

enthusiasm of a small group, for in the case of a chronic disease such as that presented in the rheumatic heart the problem is longer than that of the life of any single individual or group; hence an adequately financed, permanent, supervisory and statistical organization should be provided which will have as its object the long-range study of the adequacy of prophylaxis and therapeutics. A registry of patients with tuberculosis by health authorities has been feasible and useful. Numerically the problem of the rheumatic child and adolescent is as great as that of the tuberculous youth of this city. The permanent arrest of the active infection in the heart of the rheumatic child would seem to offer as great a chance for a useful economic life as the arrest of tuberculous infection of the lung. What appear to be needed are adequate facilities for establishing that arrest at the earliest possible moment.

PROPER CARE IN DIFFERENT PHASES OF DISEASE

The problem of the proper care of rheumatic children differs in different phases of the disease. Obviously most of them with the symptoms of acute arthritis, carditis or chorea will be sent to general or pediatric hospitals if they are not cared for in their own homes. While they are acutely ill the indications are relatively simple, and the ordinary general hospital is willing to assume the burden; but as they pass into the subacute or chronic stage the problem becomes more difficult with at present scant facilities for its solution. It is my firm conviction that at this stage the average child would be best treated in an institution where the special indications imposed by his disease can be adequately met. The retaining of a rheumatic child in general wards subjects him to greater danger of reinfection with hemolytic streptococci than would exist in a ward where the serious implications of such reinfection are recognized and measures are instituted for their prevention. The educational, recreational and psychologic requirements of these chronically bedridden and convalescent patients can best be met in special groups than among patients who are more acutely ill and undergoing more rapid recovery; their careful and gradual restoration to normal activity will be more effectively supervised and their response to exercise more easily noted than where these activities have less influence on the ultimate outcome. Convalescence from rheumatic carditis should be chronic; and to make a child in this condition compare the slowness of his recovery with that of a convalescent from pneumonia or appendicitis is to submit his psyche to a strain that may have permanent implications.

The low grade and chronic nature of many relapses, and often of first attacks, emphasizes the necessity of providing adequate care from the time of their detection, for it is practically impossible to have a patient with this type of low grade chronic disease admitted to the wards of general hospitals. Most children treated in outpatient clinics because of broken cardiac compensation are suffering from active rheumatic carditis. At present the only care possible for the majority of them is such rest as can be provided in their own homes under the unhygienic conditions that have favored the rheumatic relapse. Suffering from inflamed hearts and blood vessels, they are transported to the clinics in public conveyances, and both here and in the waiting rooms of the clinics they are often subjected to reinfection with types of streptococci against which they have not developed immunity. Is it any wonder that in so many cases the cardiac crippling is progressive? This

type of patient should be treated in the same manner as the one who has been transferred from general hospital wards after the acute illness, for their therapeutic requirements are similar.

An ideal sanatorium would provide for both the patient with active rheumatic carditis and the one in the convalescent stages, much as the tuberculosis sanatoriums contain both an infirmary and cottages or wards for prolonged convalescence. The average convalescent home for cardiac patients has evolved from the general convalescent home in charge of nurses, and with a minimum of resident medical supervision. A patient after recovering from the subacute inflammation in his heart would be better under the watchful eyes of physicians who understand the nature of his malady, even though his immediate care in this stage is largely in the hands of nurses, educators and child guidance specialists who should certainly be acquainted with his physical as well as his intellectual needs, just as the physicians and nurses should understand his particular psychologic problems.

The need for supervision of the patient on discharge from these special institutions brings up a number of questions in which the factors of familial and domiciliary environment and heredity in the etiology of rheumatic fever are at present inexplicably interwoven. Recent careful statistical analysis of rheumatic families made by Wilson and Schweitzer²⁸ and by Read and her co-workers²⁹ suggests that there is a hereditary factor at play in many instances. On the other hand, careful studies of rheumatic children's families by Paul and Salinger³⁰ suggest either that rheumatic fever may be a special manifestation of widespread respiratory infections or that these infections, suffered by most members of a family, set off the rheumatic explosion in a specially susceptible subject. Moreover, Paul's³¹ observations indicate that rheumatic manifestations are much more frequent in children than in adults subjected to the same respiratory infections which have spread through families. The status of a rheumatic patient in a family may be contrasted with that of a person with active tuberculosis: In the latter instance, the patient is a source of danger because he is a disseminator of tubercle bacilli; on the other hand, while the rheumatic patient may play a comparable role in respect to an etiologic agent of rheumatic fever, a greater danger seems to exist in the possibility that certain nonspecific respiratory infections spreading through the family will light up a new bout of rheumatic fever. In one illness the patient threatens his companions, in the other his companions threaten him.

Such peculiar susceptibility explains in part the frequency with which rheumatic relapses are observed in children who move from the favorable environments of a convalescent home to their own home. Indeed, from several aspects this move should be carefully prepared for and supervised. It should probably be postponed until after the active rheumatic fever season

28. Wilson, M. G., and Schweitzer, M.D.: Rheumatic Fever as a Familial Disease: Environment, Communicability and Heredity in Their Relation to the Observed Familial Incidence of the Disease, *J. Clin. Investigation* 16: 555 (July) 1937.

29. Read, Frances E. M.; Cioeco, Antonio, and Taussig, Helen J.: The Frequency of Rheumatic Manifestations Among the Siblings, Parents, Uncles, Aunts and Grandparents of Rheumatic and Control Patients, *Am. J. Hyg.* 27: 719 (May) 1938. Gauld, R. L.; Cioeco, Antonio, and Read, Frances E. M.: Further Observations on the Occurrence of Rheumatic Manifestations in the Families of Rheumatic Patients, *J. Clin. Investigation* 18: 213 (March) 1939. Gauld, R. L., and Read, Frances E. M.: Studies of Rheumatic Disease: III. Familial Association and Aggregation in Rheumatic Disease, *ibid.* 19: 393 (March) 1940.

30. Paul, J. R., and Salinger, Robert: The Spread of Rheumatic Fever Through Families, *J. Clin. Investigation* 10: 33 (April) 1931.

31. Paul, J. R.: Age Susceptibility to Familial Infection in Rheumatic Fever, *J. Clin. Investigation* 10: 53 (April) 1931.

has passed and should not occur when respiratory infections are rife in the family. Indeed, the home conditions may be so unfavorable as to indicate prolonged residence in a suitable foster home. The benefit of long foster home care compared with that in special institutions is now being studied by a special committee of the New York Heart Association.³² Moreover, the psychological adjustments imposed by the disease and by transfer from an institution or foster home to his own family environment would also be better supervised by properly trained persons than to leave them simply to chance. These considerations indicate that an efficient public health program would provide for investigating the families of most rheumatic children. If the housing conditions were obviously at fault, attempts would be made to have better physical environment provided in the newer and more hygienic houses now being built. If some other member of the family was acting as an obvious nidus of repeated respiratory infections, it would be important to treat him or else remove the rheumatic subject to less precarious surroundings. All the members of the family should be instructed concerning the dangers to the patient of respiratory infections and the means for inhibiting their spread.

Infectious elements may eventually be controlled by employing chemotherapeutic measures such as those tested by Coburn and Moore.³³ Obviously the administration of sulfanilamide or its derivatives to large groups of patients must be carefully supervised in order to reduce to the lowest degree the incidence of unpleasant or dangerous side actions. Parenthetically, it should be again emphasized that this drug has no curative influence on rheumatic fever but, on the contrary, often increases the severity of the rheumatic manifestations;³⁴ hence no drugs or other therapeutic measures now in our possession relieve us of the necessity of providing suitable institutional facilities for the care of rheumatic children.

Naturally, the suggested plan for the care of youthful rheumatic patients does not cover all the requirements imposed by rheumatic fever, but it does seem as though effective treatment during this age period might lessen the dangers of serious heart disease later in life and prolong the useful days of those who have been affected as children. Progressive cardiac crippling in the third and fourth decades is often the result of repeated or continuous rheumatic insults to the heart and blood vessels; hence in later life it is probable that prolonged rest and other measures directed toward increasing the patient's resistance to infection are indicated. To expect the average general hospital to assume this burden seems unreasonable; moreover, in suitably arranged sanatoriums these patients could be more effectively treated for approximately half the cost daily. The apparently favorable influence of Southern latitudes suggests the desirability of studying the treatment of some of the more intractable cases in institutions situated properly in the South.

We are too prone to demand satisfactory answers concerning etiology, immunotherapy and prophylaxis of rheumatic fever before attempting to provide facilities which seem to have a rational basis. It is well to recall

that Dr. Trudeau's therapeutic experiments were started before the discovery of the tubercle bacillus and that our present day treatment of the tuberculous patient is based on proper rest, diet and regulated exercise rather than on specific immunotherapy derived from our knowledge of the tubercle bacillus. The fact that many patients have recovered from tuberculosis without undergoing a rest cure does not relieve us of the responsibility of advising and providing for such cures; neither does the fatal outcome in many well treated cases relieve us of that responsibility. The necessity for continued investigation is still urgent in both diseases.

While many problems concerning rheumatic fever, rheumatic carditis and vasculitis remain unanswered, enough is known to warrant the institution of the measures suggested. The American Heart Association with its constituent membership of hundreds of cardiac clinics provides machinery for carrying out a part of the program. The United States Public Health Service is becoming interested to the extent of fostering both laboratory and statistical investigations. Chicago has made rheumatic fever a reportable disease. The New York Heart Association has evolved a most complete system of classification of heart diseases and established criteria on which efficient diagnostic data may be based; and this has been adopted by the American Heart Association.³⁵ The United States Bureau of the Census has agreed to separate rheumatic conditions as they appear to affect cardiac fatalities during the years 1937, 1938 and 1939.³⁶ What is really needed in vital statistics is an etiologic diagnosis in all fatal cases of heart disease in addition to the anatomic diagnosis now in vogue, and with a separate category for the unknown. In general, this rubric unknown can be applied to the entire categories 90 to 95 of the International List of Causes of Death, and only by applying probability figures to the various age groups can we obtain indexes which are probably valid if not strictly accurate. But why wait until death until we try to classify? The size of the problem and the necessity for providing proper care for the large group of patients with rheumatic heart disease would be more quickly learned by making rheumatic fever and rheumatic heart disease reportable. By and large the long-range effectiveness of our therapeutic and prophylactic measures will be measurable only if we have these data.³⁷

The seriousness of rheumatic fever to the individual and to large groups of individuals needs no arguing, but there has been less emphasis on the number of patients who have recovered from an acute attack without heart involvement and on the possibility of leading a long, useful and happy life even with a certain degree of distortion of the heart valves, if the patient has permanently subdued the rheumatic infection. It would therefore seem only the part of wisdom for society to provide the machinery whereby more patients may be moved to this more fortunate class, even though rheumatic fever still exists. This would be the objective of an efficient health program.

35. Nomenclature and Criteria for Diagnosis of Diseases of the Heart, Criteria Committee of the New York Heart Association, New York, J. J. Little & Ives Company, 1939.

36. Dunn, H. L., and Hedley, O. F.: Statistics on Deaths from Rheumatic Heart Disease, J. A. M. A. 110:1413 (April 30) 1938.

37. The aid extended by the Children's Bureau of the Department of Labor to various states for the care of rheumatic children should provide facilities for studying some of the problems here discussed. Because of the chronic nature of rheumatic heart disease, the final results of therapeutic measures established now will be measurable only after fifteen to twenty-five years. Vital statisticians should therefore be quickly furnished with reliable figures with which to begin constructing valid numerical criteria applicable to a long term analysis.

32. These foster homes are provided and supervised by the Speedwell Society.

33. Coburn, A. F., and Moore, L. V.: The Prophylactic Use of Sulfanilamide on Rheumatic Subjects, Proc. Third Internat. Cong. Microbiol., 1939, p. 596. Internat. Clin., 1940, to be published. (Dr. Coburn allowed me to consult the manuscript.)

34. Swift, H. F.; Moen, J. K., and Hirst, G. K.: The Action of Sulfanilamide in Rheumatic Fever, J. A. M. A. 110:426 (Feb. 5) 1938.

SUMMARY

The size of the problem of rheumatic heart disease, from the standpoint of public health, indicates the desirability of widely extending the facilities for meeting the situation. The long period usually consumed in the evolution of rheumatic heart disease offers opportunity for interfering with that evolution at various times. Those unfavorable factors classified as economic are subject to improvement. Favorable climatic factors may be utilized. Because functional trauma of cardiac tissues harboring rheumatic inflammation probably increases the damage to these tissues, prolonged rest for such actively diseased structures is requisite and should be provided on a scale commensurate with the size of the problem. The role of hemolytic streptococcus infections in initiating the disease rheumatic fever and in inciting relapses indicates the importance of protecting these patients from such infections.³⁸ When these elements in a public health program are clearly recognized, there can be little doubt of its establishment.

CONTROL OF DIABETES MELLITUS

RELATION TO THE HEALING OF CLEAN AND
INFECTED WOUNDS AND TO INCIDENCE
OF INFECTION IN CLEAN WOUNDS

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There continues to be a great deal of anxiety concerning the healing of wounds in cases of diabetes mellitus. Before the discovery of insulin a rising blood sugar level with increasing glycosuria was an ominous sign after a surgical operation or if the patient had an infected wound. The wounds of those who did not succumb to acidosis were likely to heal very slowly or become infected, and existing infection tended to spread. Since the advent of insulin, acidosis has been preventable and has ceased to be formidable. The other complications, however, continue to be menacing.

The idea is prevalent that such complications occur more frequently among patients with a high blood sugar level and glycosuria than among those who have a normal blood sugar level and no glycosuria. Study of the literature reveals that the methods advocated for the control of diabetes after surgical operations, or when the patient has an infected wound, vary considerably. Of the two methods which are most widely used, one¹ aims to maintain the sugar content of the blood

at a normal level and prevent glycosuria; the other² is to examine the urine every three to six hours and adjust the dose of insulin according to the degree of glycosuria. Those who advocate this procedure do not specify at what level the blood sugar should be main-

TABLE 1.—Incidence of Delayed Healing of Wounds in Relation to the Blood Sugar Level in Cases of Diabetes Mellitus

Blood Sugar Level, Mg. per 100 Cc.	Healing Time		
	Normal	Prolonged	
	No. of Cases	No. of Cases	Per Cent
Below 200.....	127	76	37.43
Above 200.....	101	24	19.20

tained or the amount of glycosuria which is permissible, but they intimate that the urine should be kept approximately sugar free. A few authors do not favor such strict control. Some of them³ state that a slight elevation of the blood sugar level (to 180 mg. per hundred cubic centimeters) with a moderate degree of glycosuria is not harmful during the first few postoperative days, provided both decrease rapidly, whereas others⁴ advise that ketosis be avoided but ignore the blood sugar level and degree of glycosuria.

No one, as far as we know, has shown that the healing of clean or infected wounds is delayed or that infection develops in clean wounds more frequently in diabetic patients with hyperglycemia and glycosuria than in those with normal blood sugar levels and no glycosuria. It is for this reason that the present study was undertaken.

The records of 324 diabetic patients who had clean or infected wounds and were receiving a small or moderate amount of carbohydrate were analyzed in order to ascertain the frequency of delayed healing of wounds in relation to the height of the blood sugar and degree of glycosuria. The incidence was compared to that in a series of 158 nondiabetic patients of the same age and sex who had comparable lesions. In addition, in a series of thirty-five diabetic patients who had either clean or infected wounds the blood sugar level was kept between

TABLE 2.—Effect on the Healing Time of Wounds of Maintaining the Blood Sugar Level Above 250 Mg. per Hundred Cubic Centimeters in Cases of Diabetes Mellitus

Blood Sugar Level, Mg. per 100 Cc.	Healing Time		
	Normal	Prolonged	
	No. of Cases	No. of Cases	Per Cent
Below 200.....	105	53	33.54
Above 200.....	91	20	18.01
Above 250.....	30	5	14.29

250 and 368 mg. per hundred cubic centimeters and the twenty-four hour urinary excretion of sugar between 50 and 150 Gm. by the daily administration of from 300 to 500 Gm. of what was actually, or potentially, dextrose. Furthermore, the incidence of infection in 323 clean

38. The importance of these etiologic elements is discussed in the first lecture of this series, Medicine, to be published.
From the Departments of Internal Medicine and Surgery, State University of Iowa College of Medicine.
Read before the Section on Practice of Medicine at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.
1. Articles describing first method:
Terry, A. H.: Diabetic Regimen in Surgical Cases, New York J. Med. 35: 159-160 (Feb. 15) 1935.
Allan, F. N.: Surgery and Diabetes, S. Clin. North America 12: 719-725 (May) 1933.
Murray, Gordon: Diabetic Infection and Gangrene, Canad. M. A. J. 41: 246-250 (Sept.) 1939.
Fowler, A. F.; Bensley, E. H., and Rabinowitch, I. M.: Control of Diabetes Mellitus with Protamine Zinc Insulin in Surgery, ibid. 36: 561-568 (June) 1937.
Gurd, F. B.: Postoperative Use of Insulin in the Nondiabetic, Ann. Surg. 106: 761-769 (Oct.) 1937.
Duncan, G. G.: The Treatment of Diabetes Mellitus During the Course of Acute Infection and Surgical Complications, Internat. Clin. 2: 31-43 (June) 1939.
Nadler, W. H.: Surgery in the Diabetic Patient, Surg., Gynec. & Obst. 68: 256-268 (May) 1939.

2. Articles describing second method:
Joslin, E. P.; Root, Howard F.; White, Priscilla, and Marble, Alexander: Treatment of Diabetes Mellitus, ed. 6, Philadelphia, Lea & Febiger, 1937, p. 532.
Ralli, Elaine P., and Standard, Samuel: The Care of the Surgical Diabetic, Surg., Gynec. & Obst. 58: 228-232 (Feb.) 1934.
Hunter, John T., in discussion on Surgery in Diabetic Patients, Proc. Roy. Soc. Med. 32: 999-1014 (June) 1939.
3. McKittrick, L. S.: Surgical Procedures in the Presence of Diabetes Mellitus, Surg., Gynec. & Obst. 68: 508-518 (Feb.) 1939.
4. Biloon, Solomon; Harris, M. M., and Ringer, A. I.: Infection and Diabetes, M. Clin. North America 12: 835-846 (Nov.) 1928.
Hirschworth, H. P., in discussion on Surgery in Diabetic Patients, Proc. Roy. Soc. Med. 32: 999-1014 (June) 1939.

operative wounds in cases of diabetes mellitus was ascertained. In the endeavor to decide whether the healing time has been normal or prolonged, each patient's record was studied by all three authors independently. The patients were divided into two groups, according to the blood sugar level and degree of glycosuria. Those whose blood sugar values were consistently below 200 mg. per hundred cubic centimeters with slight or no glycosuria were placed in one group, and those whose blood sugar levels were consistently above 200 mg. per hundred cubic centimeters with moderate to extreme glycosuria were placed in the other. In both groups the patients were classified according to the adequacy or inadequacy of the blood supply to the wound-bearing area. The blood supply to such areas in the head, neck, trunk and upper extremities was regarded as good in all cases. Arbitrarily, unless there was some statement in the record to the contrary the supply of blood to the

The foregoing observations raise the following question: How much more frequently is the healing of wounds delayed in patients with diabetes mellitus than in nondiabetic patients of the same age and sex with comparable lesions? This question is answered in table

TABLE 5.—*Relation of Infection to the Incidence of Delayed Healing of Wounds in Patients With, and Without, Diabetes Mellitus*

	Healing Time		
	Normal		Prolonged
	No. of Cases	No. of Cases	Per Cent
Clean Wounds			
Diabetic.....	159	43	21.28
Nondiabetic.....	99	14	12.39
Infected Wounds			
Diabetic.....	69	67	49.26
Nondiabetic.....	19	26	57.77

TABLE 3.—*Incidence of Delayed Healing of Wounds in the Diabetic and the Nondiabetic, of the Same Age and Sex, Who Had Comparable Lesions*

	Healing Time		
	Normal		Prolonged
	No. of Cases	No. of Cases	Per Cent
Diabetic.....	228	100	29.53
Nondiabetic.....	118	40	23.31

TABLE 4.—*Incidence of Delayed Healing of Wounds in Relation to the Blood Supply of the Wound-Bearing Area in Patients With, and Without, Diabetes Mellitus*

	Healing Time		
	Normal		Prolonged
	No. of Cases	No. of Cases	Per Cent
Good Blood Supply			
Diabetic.....	163	22	11.89
Nondiabetic.....	80	9	10.11
Poor Blood Supply			
Diabetic.....	65	78	54.54
Nondiabetic.....	38	31	44.92

lower extremities was regarded as adequate in all patients less than 40 years of age and as inadequate in all who were more than 40 years old. The patients were divided still further, depending on whether their wounds were clean or infected.

RESULTS AND COMMENTS

Table 1 shows that delayed healing of wounds did not occur as frequently in the patients with the higher blood sugar levels and greater degree of glycosuria as it did in those with lower blood sugar values. These observations do not support the prevalent idea that hyperglycemia and glycosuria hinder the healing of wounds in cases of diabetes mellitus. The data become even more impressive when it is pointed out that a vigorous but unsuccessful attempt was made to reduce the hyperglycemia in the more severe cases of diabetes. Furthermore the fact that maintenance of the blood sugar level above 250 mg. per hundred cubic centimeters had no deleterious effect on the healing time of wounds (table 2) substantiates the contention that hyperglycemia and glycosuria are not to be regarded as important factors.

3, which shows that the diabetic patient's chance of having delayed healing is approximately 4 per cent greater.

If this is true there are several possible factors which must be considered. First there is the question of the utilization of dextrose. In cases in which the dextrose intake is kept constant and the hyperglycemia and glycosuria tend to increase, the diabetes is growing worse and the patient's ability to utilize dextrose is decreasing. Under such circumstances, delay in the healing of wounds may be erroneously attributed to the hyperglycemia and glycosuria when, as a matter of fact, the patient's inability to utilize a sufficient amount of dextrose is a more likely factor. Except for the first few days after their surgical operations, our nondiabetic patients utilized from 300 to 350 Gm. of dextrose daily. On the other hand, our diabetic patients, except the thirty-five who were receiving very large amounts of dextrose, utilized only 100 to 170 Gm. Can the

TABLE 6.—*Relation of Various Factors to the Incidence of Delayed Healing of Wounds in Patients With, and Without, Diabetes Mellitus*

Blood Sugar Level, Mg. per 100 Cc.	Wound					
	Clean Healing			Infected Healing		
	Normal		Delayed	Normal		Delayed
	No. of Cases	No. of Cases	Per Cent	No. of Cases	No. of Cases	Per Cent
Good Blood Supply						
Below 200.....	71	4	5.3	14	11	44.00
Above 200.....	56	2	3.4	22	5	18.50
Above 250.....	15	0	0.0	10	2	16.00
Nondiabetic.....	72	2	2.7	8	7	46.00
Poor Blood Supply						
Below 200.....	22	23	51.10	20	38	65.50
Above 200.....	10	4	28.50	13	13	50.00
Above 250.....	0	0	0.0	5	3	37.50
Nondiabetic.....	27	12	30.70	11	19	63.50

greater incidence of delayed healing of wounds in diabetes mellitus be explained by this lower utilization of dextrose? We cannot answer this question at present. All our patients used enough dextrose to escape ketosis, but it is possible that the avoidance of ketosis alone is not sufficient to prevent delay in the healing of wounds.

It is generally agreed that patients with diabetes mellitus tend to develop arteriosclerosis earlier and to

a greater degree than nondiabetic persons. If this is true it could account for the greater frequency of delayed healing in cases of diabetes. Table 4 shows that the incidence of delayed healing of wounds in areas which were well supplied with blood was no greater among the diabetic than among the nondiabetic but when the wound-bearing area was poorly supplied with blood the incidence was higher among the diabetic. It is possible, therefore, that arteriosclerosis may be a factor.

Another possibility which must be considered is wound infection, but table 5 shows that diabetes did not interfere with the healing of infected wounds. In cases of diabetes it is the associated arteriosclerosis which accounts for the higher incidence of delayed healing of uninfected wounds. The relation of various factors to

rosis, however, increases the incidence of infection regardless of the blood sugar level and degree of glycosuria (table 8).

We do not wish to insinuate that the blood sugar level and degree of glycosuria should be neglected, for, if they were, it is obvious that we would have no accurate conception of the severity of the disease and would be unable to control it intelligently.

SUMMARY

In 324 cases of diabetes mellitus, the relation of the incidence of delayed healing of clean and infected wounds to the height of the blood sugar level and degree of glycosuria was studied.

In thirty-five cases of diabetes mellitus, the effect on the healing time of wounds of maintaining an unusually high blood sugar level and extreme degree of glycosuria was ascertained.

The incidence of delayed healing of wounds of 324 diabetic patients was compared with that in 158 nondiabetic persons of the same age and sex who had comparable lesions.

The relation of the blood sugar level and degree of glycosuria to the frequency with which infection developed in 323 originally clean operative wounds in cases of diabetes mellitus was ascertained.

As a result of our observations, we conclude that there is no relationship between the height of the blood sugar level and degree of glycosuria and the incidence of delayed healing of wounds or of infection in originally clean wounds in cases of diabetes mellitus. Delayed healing of wounds occurs approximately 4 per cent more frequently among the diabetic than among the nondiabetic of the same age and sex. The lower utilization of dextrose and the greater degree of arteriosclerosis are possible causes for this greater incidence.

ABSTRACT OF DISCUSSION

DR. ELLIOTT P. JOSLIN, Boston: All my life I have tried to treat diabetes just as aggressively as I could, and as I watched the cases over a series of years it has seemed as if the patients did better and better. Therefore it astonishes me somewhat to hear that one can get better results with the healing of wounds with high blood sugars than with low, with the abnormal than with the normal. I confess that I cannot furnish data to combat the authors' thesis, but before accepting it and changing a life's principle to treat diabetes just as aggressively as possible I would wish in the published article that the authors would give us more data relating to their observations. First, I am curious to know whether the blood sugars were fasting or taken after a meal. I would be interested to know whether the blood sugars were blood sugars on diets which were low or high in carbohydrate and calories. I would also like to know about the dosage of insulin and whether the patients were under treatment with it throughout the studies. Then too I cannot accept the classification of adequacy of the circulation of the extremities by a 40 year age limit. How many of the patients recovered? And in which group was the percentage of recoveries the highest? I cannot give information directly combating the paper but I would refer to an article of Dr. L. S. McKittrick (*Arch. Surg.* 40:352 [Feb.] 1940), of about a thousand operations in our series of patients, in which he showed that the results of the treatment of our surgical patients has been steadily improving, and I know that this has gone hand in hand with a more and more rigorous treatment of the diabetes. Whenever we hear statements which are a little different from those with which we have grown up, we should be very open minded. I am open minded and shall watch in the future still more to see whether patients do better in those clinics where higher blood sugars than are normal are countenanced than in those where medical supervision is more orthodox. It is difficult for me to believe

TABLE 7.—Incidence of Infection in Clean Operative Wounds in Relation to the Blood Sugar Level in Cases of Diabetes Mellitus

Blood Sugar Level, Mg. per 100 Cc.	Wounds		
	Originally Clean	Became Infected	
	No. of Cases	No. of Cases	Per Cent
Below 200.....	191	39	20.42
Above 200.....	132	17	12.88

TABLE 8.—Relation of Blood Supply and Blood Sugar Levels to the Incidence of Infection of Clean Operative Wounds in Cases of Diabetes Mellitus

Blood Sugar Level, Mg. per 100 Cc.	Wounds		
	Originally Clean	Became Infected	
	No. of Cases	No. of Cases	Per Cent
Good Blood Supply			
Below 200.....	88	15	17.04
Above 200.....	91	5	5.59
Total.....	179	20	11.17
Poor Blood Supply			
Below 200.....	103	24	23.30
Above 200.....	41	12	29.27
Totals.....	144	36	25.00

the incidence of delayed healing of wounds in patients with and without diabetes mellitus is shown in table 6. It is to be noted that diabetes had no deleterious effect on the healing of clean or infected wounds when the wound-bearing area was well supplied with blood.

The possibility that wounds are more likely to become infected in cases of diabetes than among the nondiabetic is another source of constant anxiety. It is generally believed that the incidence of wound infection is directly proportional to the height of the blood sugar level and the degree of glycosuria. The incidence of development of infection in clean operative wounds in relation to the blood sugar level in our cases of diabetes mellitus is shown in table 7. It will be seen that the wounds of the patients with the higher blood sugar levels became infected less frequently than those of the patients with the lower levels. These observations do not substantiate the popular opinion that high blood sugar levels of patients with diabetes mellitus tend to promote the development of infection. The presence of arterioscle-

that the nearer my patient is kept to the condition of a normal individual it will do him harm; I felt that it did him good.

DR. ROY D. McCLURE, Detroit: Like Dr. Joslin, I had always felt that an attempt should be made to reduce the blood sugar level before operation. The authors have been careful to state that this study should not cause any relaxation with regard to the preoperative and postoperative care of the diabetic surgical patient. Other factors present in the diabetic as well as in the nondiabetic patient are of undoubted significance in wound healing. Arteriosclerosis is well emphasized in the authors' tables. Acidosis, indicative of lack of dextrose utilization, is ominous. The untreated or malnourished person with diabetes may be deficient in vitamin C and plasma proteins, which appear to be important in wound healing. Fifty cases of wound disruption were recently studied by Dr. L. S. Fallis at the Henry Ford Hospital (*Surgery* 1:523 [April] 1937). Two of these patients, both women in their fifties convalescing from pelvic operations, had diabetes. The postoperative blood sugar of one patient was 192 and of the other 135. Wound disruption occurred despite adequate control of the diabetes. The first patient recovered after secondary suture. Obviously the second patient should have been treated conservatively by packing and strapping for she died shortly after an ill advised secondary wound suture. With our present practice of maintaining proper vitamin C and protein levels in the blood, such disruptions might not have occurred. The value of a high type of medical management has long been obvious. In a recent report from Bellevue Hospital (Standard, Samuel; Brandaleone, Harold, and Ralli, Elaine P.: *Surgical Results in the Treated and Untreated Diabetic Patient*, *THE JOURNAL*, Feb. 26, 1938, p. 627) the mortality from all types of operations was increased threefold in a group of nonclinic patients who had not been followed preoperatively. Following operation for complications of diabetes such as amputations and drainage of abscesses the postoperative course in my experience has not been as good as in the nondiabetic. But for elective surgery, if the diabetic patient has the advantage of adequate control of the diabetes and the maintenance of satisfactory protein, mineral, vitamin and water balance level the wound should heal as well as a comparable one in a nondiabetic patient.

DR. JAMES A. GREENE, Iowa City: It was not our purpose to discuss all the factors that are concerned in the healing of wounds. The purpose of our investigation, as we have stated, was to ascertain whether or not hyperglycemia and glycosuria were important factors in the healing of wounds in patients with diabetes mellitus. I think that delayed healing of wounds has been attributed frequently to the presence of hyperglycemia and glycosuria when as a matter of fact too much suture material has been employed or the tissues have been traumatized excessively. We do not advocate that a patient's diabetes should be neglected, and we made a statement to that effect in our report. The blood sugar estimations were obtained in our study two hours after a diabetic breakfast. The potential dextrose intake of these patients, except for the thirty-five who received large amounts, were from 110 to 170 Gm. daily. With regard to the use of insulin, our patients did not all receive insulin because the diabetes of some was not sufficiently severe. We adhere to the generally accepted indications for the use of insulin in our cases. The quantity of insulin was not correlated with delayed healing of wounds or with the incidence of infection, because we did not consider that it was significant in this study. The question raised regarding the arbitrary choice of 40 years as being the age when arteriosclerosis begins is a pertinent one. We recognized this difficulty, but from our data we arbitrarily chose this age. Perhaps it should be 50 or 60; we do not know; but we do not think that selection of either of the latter ages would materially alter the data that we have presented. With regard to the number of deaths, we did not include them because we were unable to ascertain whether or not a wound healed unless the patient lived for a sufficient length of time. There was a question from the floor regarding the frequency of evisceration or separation of abdominal wounds in diabetic patients. We have not observed this to occur any more frequently in diabetic than in nondiabetic patients.

AUTOMOBILE ACCIDENTS IN A RURAL AREA TRAVERSED BY A TRANS-CONTINENTAL HIGHWAY

JOHN H. POWERS, M.D.

COOPERSTOWN, N. Y.

An automobile accident in the open country is far more likely to result in serious injury and death than is a collision on the congested highways of a metropolitan district. In New York State during the past three years 8,022 persons were killed and 298,846 were injured by motor vehicles. Greater New York, with 55 per cent of the population of the state, was credited with 60 per cent of the accidents but only 30 per cent of the fatalities.¹ During these same three years rural

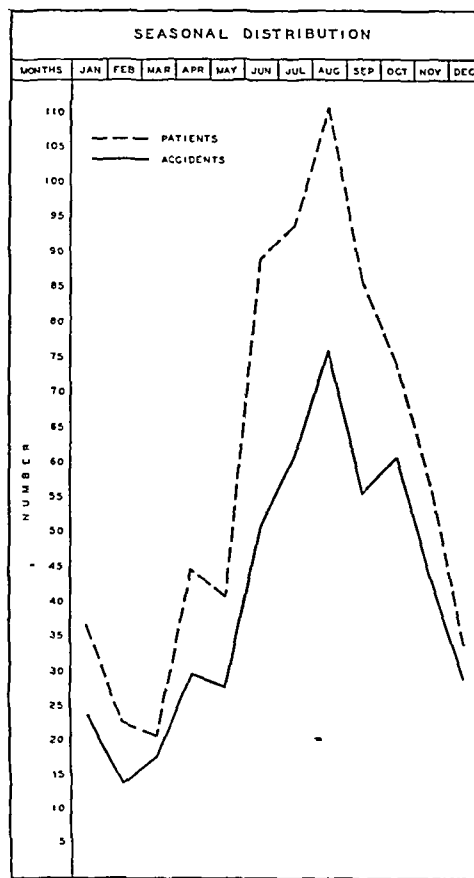


Chart 1.—Seasonal distribution of rural automobile accidents. The solid line represents the number of accidents each month, the broken line the number of patients injured. August is the most dangerous month.

New York, with 15 per cent of the population, was credited with 40 per cent of the fatal accidents.

The surgical staff of the Mary Imogene Bassett Hospital in Cooperstown, N. Y., is in a particularly favorable position for the study of automobile accidents in a rural area. The village is situated in the eastern central part of the state, 10 miles south of U. S. Route 20 a transcontinental highway from Boston and New York through Albany, Syracuse, Buffalo, Cleveland

From the Department of Surgery of the Mary Imogene Bassett Hospital.

Read before the joint meeting of the Section on Surgery, General and Abdominal, and the Section on Orthopedic Surgery at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

1. Monthly and Annual Reports of the Bureau of Motor Vehicles of the Department of Taxation and Finance of the State of New York, Albany, 1937, 1938 and 1939.

and Chicago to the West. The hospital serves an area 50 miles in length along this highway and most of the persons seriously injured on this section of Route 20 are referred there for treatment.

The survey embraced by this report is based on the analysis of 492 accidents from which 712 patients were received at the hospital during the years 1930-1939 inclusive. It includes all the accidents in which a motor vehicle participated in any way other than those which

TABLE 1.—Type of Locality in Which 492 Rural Automobile Accidents Occurred

Locality	Accidents		Patients	
	Number	Per Cent	Number	Per Cent
Open country.....	308	72.0	487	76.7
Rural village.....	120	28.0	148	23.3
Unknown.....	64		77	
Total.....	492		712	

The percentages have been computed only from those accidents about which the facts are known.

occurred in a public garage or on a farm. The material will be presented in graphic and tabular form in two sections: first, that which deals primarily with

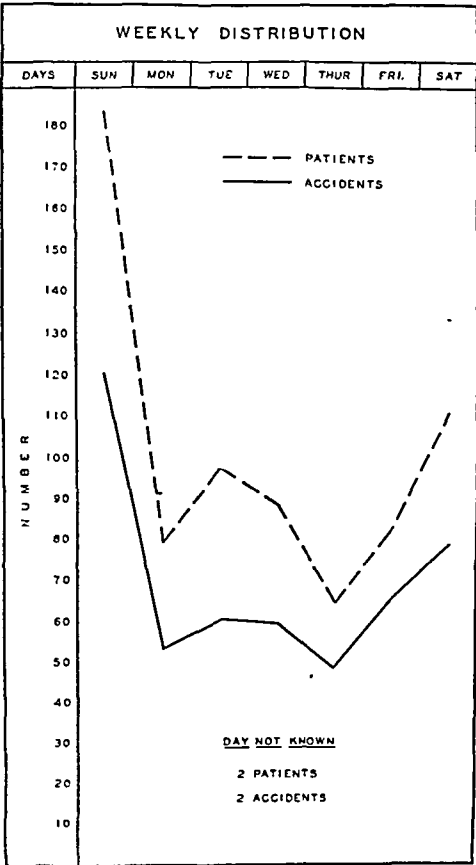


Chart 2.—Weekly distribution of rural automobile accidents and number of persons injured thereby. Both are most common on Sunday.

the accidents and the number of persons hurt and, second, that which applies particularly to the patients and their injuries.

ANALYSIS OF ACCIDENTS

Seasonal, Weekly and Daily Distribution.—The distribution of these accidents throughout the year and the number of patients injured each month are presented

in chart 1. The heavy solid line represents the number of accidents, the broken line the number of patients. The sharp increase in the number of accidents and particularly in the number of persons injured on the open road during the summer is striking. The peak occurs in August, which is without question the most dangerous month of the year in the country,² both on the highway and on the farm.³ It is interesting that February and March, when the roads are in the worst possible condition, are the safest months for travel in rural areas.

In chart 2 is presented graphically the distribution of rural motor accidents by days throughout the week. The week end is extremely hazardous, particularly Sunday. Not only do most accidents occur on this day but more people are injured per accident. Monday and Thursday are comparatively safe.

Chart 3 represents the distribution of accidents throughout the day. It is apparent that the hours of late afternoon and early evening are the most dangerous. Traffic is heaviest during this portion of the day, drivers and pedestrians both are weary, and both are anxious to reach their destinations; excessive speed by the former and undue carelessness by the latter are common. The hours between 5 and 8 o'clock in the morning are safest for travel on the open road; drivers are rested and traffic is light.

Sixty per cent of these 492 accidents occurred during the hours of daylight, 33 per cent at night, and 7 per cent during the dusk of early morning or late afternoon.

Location of Accidents.—The location of sixty-four accidents in which seventy-seven patients were injured is unknown. Seventy-two per cent of the remaining accidents, in which 76.7 per cent of the patients were involved, occurred in the open country (table 1).⁴

Thirty-six and one-tenth per cent of the accidents took place on straight roads, 20.7 per cent on curves, 12.9 per cent at intersections and 10.1 per cent on hills. Many of the fifty-four accidents which occurred in driveways, yards, parking spaces and private garages

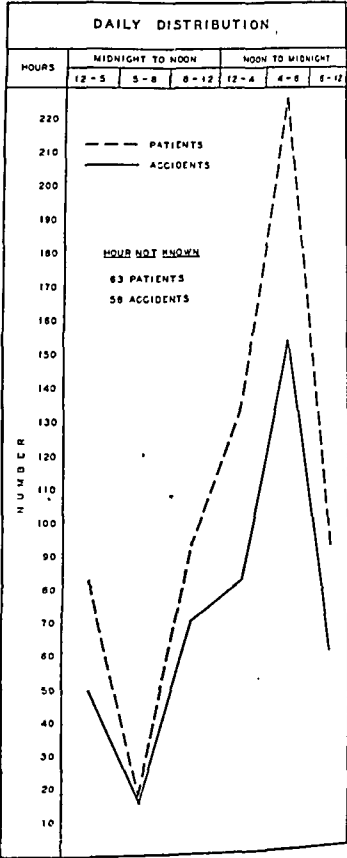


Chart 3.—Daily distribution of rural motor accidents and casualties. Both are most numerous between the hours of 4 and 8 p. m., least common between 5 and 8 o'clock in the morning.

2. Powers, John H.: Rural Medicine: Emergency Surgery in a Rural Hospital, Springfield, Ill., Charles C. Thomas, Publisher, 1939, pp. 51-63.
3. Powers, John H.: The Hazards of Farming, J. A. M. A. 113: 1375-1378 (Oct. 7) 1939.
4. In this and all subsequent tabulations the percentages have been computed from only those accidents about which the facts are known.

were due to passengers falling while entering or leaving cars or to drivers cranking or repairing their own machines (table 2).

Classification of Accidents.—Accidents in which the car was in motion but no collision occurred were most frequent. These were usually due to failure to make a turn by an operator who was driving too fast on a road with which he was unfamiliar (table 3). Collisions between motor vehicles, with fixed objects, and with pedestrians were next in order of frequency. These four types comprised 82.6 per cent of those accidents in which the data are known.

Types and Condition of Vehicles Involved.—Of 607 vehicles involved, 84.7 per cent were passenger cars (table 4); 82.2 per cent of the vehicles were apparently in good condition, a fact which strongly suggests that most of the accidents were due to carelessness of the driver; 3.4 per cent had defective tires, 2.8 per cent defective brakes, 2.4 per cent defective headlights and 1.9 per cent a defective steering mechanism (table 5).

Types of Collisions.—Head-on collisions and side-swipes were most common and comprised 73.5 per cent of the accidents. Angle and rear end collisions were less frequent. Two hundred and thirty patients were injured in 184 accidents in which no collision occurred.

Direction of Travel.—Eighty-two per cent of the patients were injured while traveling straight ahead. Surprisingly few mishaps occurred while turning in either direction or backing. The solution of the problem of automobile accidents on rural highways appears to rest largely with the operator who is driving forward.

Condition of Drivers, Roads and Weather.—Eighty-three per cent of the accidents happened while the vehicles were being operated by drivers who were apparently normal; 9.3 per cent were obviously intoxicated and 4.1 per cent were admittedly asleep.

Nearly 70 per cent of the accidents in which likewise 70 per cent of the patients were injured occurred in

of 5 and 8 o'clock in the morning. If the road is crooked with many intersections, the surface snowy or icy and the weather foggy, one may venture forth with a reasonable certainty of reaching one's destination. And, as a matter of fact, such is actually the case because under those conditions one will be forced to drive both slowly and carefully.

ANALYSIS OF INJURIES

Distribution by Age and Sex.—In the rural section of central New York embraced by this study both sexes were injured in automobile accidents very much more often between the ages of 15 and 24 inclusive than during any other decade of life. Throughout all ages males were involved with twice the frequency of females (chart 4).

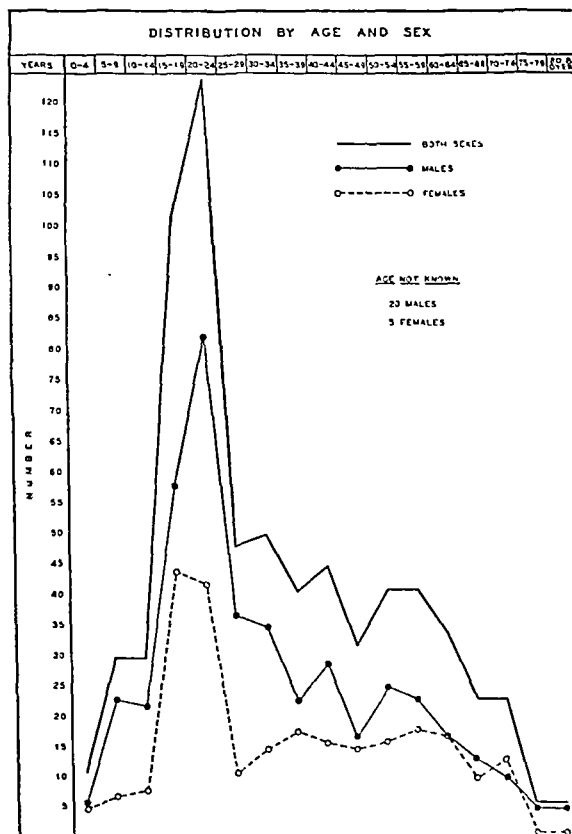


Chart 4.—Graphic analysis by age and sex of persons injured in 492 automobile accidents.

TABLE 2.—Topographic Location of Accidents; Number and Percentage of Patients Injured in Each Locality

Topography	Accidents		Patients	
	Number	Per Cent	Number	Per Cent
Straight road.....	143	36.1	220	36.9
Curve.....	82	20.7	143	23.9
Intersection.....	51	12.9	67	11.3
Hill.....	40	10.1	62	10.4
Hill and curve.....	14	3.5	29	4.9
Bridge or underpass.....	7	1.8	14	2.4
Railroad crossing.....	5	1.3	5	0.8
Driveway, yard, parking space or garage.....	54	13.6	56	9.4
Unknown.....	96		116	
Total.....	492		712	

clear weather. Those which took place when the sky was overcast or during rain, fog and snow are listed in order of frequency in table 6.

Two thirds of the accidents in which the data are known happened on dry roads. Wet pavement was a contributory factor in 20.2 per cent; ice and snow were responsible for only a small proportion.

COMMENT

From the preceding facts it is apparent that persons who wish to comply with every precaution for safety on the rural highway should confine their driving to any Thursday in February or March between the hours

Position of Patients When Injured.—Drivers and passengers in the front seat were injured with equal frequency, passengers in the rear seat less than half as often. Pedestrians and cyclists comprised only a small proportion of the patients (table 3).

Classification of Injuries.—The 712 patients injured in these 492 accidents received 2,891 recorded injuries, classified according to the second edition of the Standard Classified Nomenclature of Disease. Fractures comprised the most common group; there were 655, of which seventy-four were compound. Lacerations, contusions and abrasions were next in the order of frequency. One hundred and eighty-four of the patients sustained concussion of the brain and 104 patients were in shock when they arrived at the hospital, an incidence of 26 per cent for the former and 15 per cent for the latter.

Topographic Location of Injuries.—Actually of more interest in a study of the injuries received in automobile accidents is their topographic distribution. The head and neck appear to be most susceptible and in this series were injured twice as frequently as any other portion of the body. Traumatic lesions of the shoulder and upper extremity, the trunk, and the hip and lower extremity were comparable to one another in numbers but less than half as common as injuries of the head and neck.

Period of Hospitalization.—As a result of these automobile accidents, 473 patients spent 9,580 days in the hospital, or a total period of 26.3 years. Eighty-nine patients were admitted for one day or less, and thirty-eight patients spent only two days. The average period of hospitalization was 20.3 days. Eighty patients made only one visit to the accident ward and then went on their way. The average number of visits was four.

Fatalities.—Thirty-five accidents were fatal. Twelve persons were killed immediately or died at the scene of the accident before the ambulance arrived; two of these are known to have sustained multiple compound fractures of the skull and face. Seven patients were moribund on admission to the hospital and survived for an average period of only thirty-five minutes after arrival. With the exception of one patient who succumbed to a pulmonary embolus 237 days after his accident, the duration of life in the remaining fifteen fatal cases was approximately six days.

The chief causes of death among the twenty-three patients who reached the hospital were fractures of the skull (seven simple and five compound) twelve cases, intracranial hemorrhage without fracture two cases,

TABLE 3.—Classification of Accidents

Type	Accidents		Patients	
	Number	Per Cent	Number	Per Cent
Collision between motor vehicles	104	22.2	206	30.0
Collision with fixed object	89	19.0	152	22.2
Collision with pedestrian	76	16.2	81	11.8
Collision with bicycle	8	1.8	9	1.3
Collision with railroad train	4	0.9	4	0.6
Collision with animal	3	0.6	4	0.6
No collision—car in motion	118	25.2	162	23.6
No collision—car stationary	66	14.1	68	9.9
Unknown	24		26	
Total	492		712	

TABLE 4.—Types of Vehicles Involved in 492 Accidents in Which 712 Patients Were Injured

Type	Accidents		Patients	
	Number	Per Cent	Number	Per Cent
Passenger cars	514	84.7	636	89.4
Trucks	68	11.2	48	6.7
Motorcycles	16	2.6	18	2.5
Bicycles	8	1.3	9	1.3
Bus	1	0.2	1	0.1
Total	607		712	

fracture-dislocation of the spine (one cervical and one dorsal) two cases, crushing injury of chest with ruptures of multiple intrathoracic and intra-abdominal viscera one case, pulmonary embolism three cases and bronchopneumonia two cases.

The mortality rate for accidents on the open road was 8.5 per cent; in other words, one accident out of every twelve was fatal.

SUMMARY

During the years 1930-1939 inclusive 712 patients were treated for 2,891 injuries sustained in 492 automobile accidents in a rural area traversed by a trans-continental highway.

Such accidents occurred most frequently on week ends during the summer while driving straight ahead in

TABLE 5.—Condition of Vehicles Involved

Condition	Accidents	
	Number	Per Cent
Apparent good condition	438	82.2
Defective tires	18	3.4
Defective brakes	15	2.8
Defective headlights	13	2.4
Defective steering mechanism	10	1.9
Defective tail lights	5	0.9
Other mechanical defects	34	6.4
Unknown	74	
Total	637	

TABLE 6.—Condition of the Weather

Weather	Accidents		Patients	
	Number	Per Cent	Number	Per Cent
Clear	230	69.3	360	63.2
Rainy	37	11.2	56	10.8
Cloudy	23	6.9	37	7.1
Foggy	23	6.9	34	6.5
Snowy	19	5.7	33	6.4
Unknown or irrelevant	160		192	
Total	492		712	

open country on dry roads in clear weather during the hours of daylight. Accidents in which no collision occurred were most frequent; head on collisions with other cars, with fixed objects and with pedestrians were common. Eighty-two per cent of the vehicles were apparently in good condition and 83 per cent of the drivers were apparently normal.

Males were involved twice as frequently as females. Serious injuries were common. Fractures comprised 22 per cent of the traumatic lesions; 26 per cent of the patients sustained concussion of the brain and 15 per cent were in shock. The head and neck were injured with twice the frequency of the trunk or either of the extremities.

The average period of hospitalization was 20.3 days and the average number of outpatient visits was four.

The mortality for accidents on the open road was 8.5 per cent.

CONCLUSION

Excessive speed and lack of acquaintance with the hazards of the open road are responsible for most automobile accidents on rural highways.

ABSTRACT OF DISCUSSION

DR. ALAN DEFOREST SMITH, New York: Within recent years the surgeon in rural communities has been confronted with a type of serious accident which is entirely new, and on the whole he has acquitted himself very creditably. This applies not only to hospitals and surgeons of the type of the staff at Mary Imogene Bassett Hospital, where, of course, one would expect these conditions to be well treated, but to the surgeons throughout the country. Partly responsible for this are the activities of the Committee on Fractures of the American Medical Association and of the American College of Surgeons, who have done so much work in raising the standard of the treatment of fractures throughout the country. This is

going to have an important bearing on our participation in the activities which are now going on abroad. When we get into the show this time, we shall find that we have many more surgeons who are well trained in treating fractures and serious injuries than we had last time. Indifference of the country as a whole to a situation which results in as many casualties yearly as we suffered from our participation in the World War is something that is hard to comprehend. Publication of statistics of this kind will help very much to bring about some reaction that will result in lessening these accidents. I hope that the statistics which Dr. Powers has will be made available to the public, because I think that there they will do the most good. One of his outstanding conclusions is that the reckless driver is chiefly responsible for the large number of accidents, but nevertheless the careful driver, the innocent man, is just as likely to suffer as a result of the reckless driving as the man who is himself responsible. One way we could diminish these accidents is to be more strict about revoking licenses of habitually careless and reckless drivers. The wisdom of issuing automobile licenses to minors is questionable, and that is borne out by the very large number of minors and young people who are involved in accidents. Any one who operates or owns an automobile should be compelled to insure himself against the economic consequences of the accidents that may occur. That applies not only to the people who are injured in the accident but also to the hospital and the doctor. The dictates of ordinary humanity demand that any doctor or any hospital shall take care of the patient who is injured in this way out in the country, and yet very often they are not recompensed in any way and they certainly should be. These people should be compelled to insure themselves against the consequences of these accidents.

DR. JOHN H. POWERS, Cooperstown, N. Y.: I have some statistics on one point which Dr. Smith brought out, namely the financial aspect of these accidents. At the Mary Imogene Bassett Hospital the staff is on a full time basis and all the bills are rendered and collected by the hospital. I was interested in discovering that 73 per cent of these 712 bills were paid in full, 12 per cent were paid in part and 15 per cent had to be written off completely. This 15 per cent represented a loss during the past ten years of approximately \$20,000. The other point I wish to emphasize is this: That by the most conservative estimate at least 95 per cent of all automobile accidents are due to recklessness and carelessness and are therefore preventable. The reduction of such accidents is a problem of national importance and is worthy of consideration by every surgeon who is fundamentally interested in the preventive aspect of his profession.

The Fluoroscope Replaces Mantoux Test.—In Puerto Rico the fluoroscope is our chief instrument for the early diagnosis of tuberculosis, while the pneumothorax apparatus constitutes our great recourse for controlling the spread of tubercle bacilli. We are using the fluoroscope as a substitute for the tuberculin test in the screening of suspicious cases of tuberculosis in adults and in children above the age of 12. We feel justified in this substitution because of the high proportion of tuberculin reactors above the age of 12. Over 80 per cent of children in the teens give positive reactions to the Mantoux test and we have concluded that it saves time, effort and money to fluoroscope every suspicious adolescent and adult on his first visit to the clinic rather than wait for the result of a tuberculin test which in over 80 per cent of the cases will be positive. . . . We take x-ray pictures with our fluoroscopes. They are 30 milliamper machines, and, where a radiographic equipment is not available, they are equipped with a timer and a cassette-stand which make possible the taking of x-ray plates with very simple adjustments. . . . The fluoroscopic work is done by specialists, but the medical officers of the public health units are being trained in its use. The number of fluoroscopic examinations made in the tuberculosis clinics of the Health Department during the fiscal year 1938-1939 was 71,220.—Pastor, J. Rodriguez: *The Fluoroscope and the Pneumothorax Apparatus as Tools for the Protection of the Public Health, Puerto Rico Health Bulletin*, September 1940.

THE EFFECT OF ALCOHOL ON VISION

AN EXPERIMENTAL INVESTIGATION

Z. WILLIAM COLSON, M.D.

BOSTON

These experiments were suggested by two personal subjective observations. The first was made rather startlingly in France over twenty years ago, following a champagne binge with a group of fellow aviators. When we left the café and started back to our billets my peripheral fields seemed to be markedly contracted, although central visual acuity appeared to be unaffected. I felt that I was looking through a pair of nonmagnifying binoculars. The second observation was made more recently. On leaving a brightly lighted cocktail party and stepping immediately into the dark, there seemed to be a definitely prolonged interval of my dark adaptation.

The first of these experiments were conducted in my office, but concern as to my local reputation necessitated transfer of the work to a research laboratory. I was particularly fortunate in my choice of "guinea pigs." Most of them were young professional men of higher than average intelligence and cooperation. Some were able to persuade their wives to be subjects for testing.

There were twenty-one subjects in all, and their ages ranged from 27 to 44. The average age was under 30.

A preliminary test was made of visual acuity, near vision, visual fields, color vision, muscle balance and dark adaptation. Each subject was then given a carefully measured 2 ounces of good quality rye or scotch with ginger ale or soda as he chose. Some preferred their drinks straight. The 2 ounce drinks and tests were repeated at half hour intervals until the subjects reached their gastric tolerance or in some other manner became incapacitated for further tests.

Since the intake was rapid enough to constitute fairly serious drinking, most of the tests were discontinued after 8 or 10 ounces, although one subject succeeded in consuming 20 ounces and was fully cooperative throughout the entire experiment.

The purpose of the tests was to determine the immediate visual effects of a few drinks as ordinarily consumed by the drinking public. There was no attempt to appraise the effects of chronic alcohol intoxication.

RESULTS OF TESTS

Visual Acuity.—Vision was taken by artificial illumination so that the light would remain the same throughout the experiments. In each case visual acuity in the preliminary test was 20/20—1 or 2, or better, with correction. Only three subjects showed any demonstrable reduction in visual acuity, and this reduction can be explained by the fact that in these cases the test was immediately followed by violent emesis.

Near Vision.—A Lebensohn near vision test chart was used at a distance of 14 inches. Most of the subjects at the outset had better than normal near vision, rating 1.2. There was no appreciable change after the alcohol intake.

Visual Fields.—A complete peripheral field was not done in these cases, because it was thought that the element of fatigue might enter as a definite factor. To simplify the procedure, in each case the fields were

taken on a standard perimeter, for one eye only, in the four cardinal directions. There was not the slightest variation in fields following alcohol intake.

Color Vision.—Color vision was tested by use of Ishihara charts under uniform artificial illumination. There was only one color blind individual found on the preliminary test, and his subsequent reading of the figures did not indicate any change in color vision. All others showed no change in color vision.

Dark Adaptation.—This was determined with an apparatus incorporating a graded wedge as the filter. The subject was preexposed to a bright light for three minutes before measurements were begun. Since I had no experience with this apparatus, Dr. David Cogan was kind enough to supervise the dark adaptation tests. From the standpoint of directness and simplicity, this test was the most difficult. It is a procedure which requires close attention and cooperation and, frequently repeated, may cause fatigue. If the tests had shown a slowing of dark adaptation, this could have been ascribed to lack of attention or delayed verbal response to light stimuli. In spite of these difficulties the curves, with one exception, came well within normal limits. The only subject who showed a prolongation of adaptation time was also the one who showed low dark

prism diopter, in one 1, in two 2 and in one 3. One subject had exophoria of 2 prism diopters. Hyperphoria in no case exceeded $\frac{1}{2}$ prism diopter. The tests were repeated during the experiment every half hour. There was practically no effect on the vertical muscle balance—only in two cases was it increased 1 prism diopter—but there was a gradually increasing esophoria in each case, which in two cases reached the stage of actual strabismus with diplopia. In one of the latter cases the esophoria increased from 3 to 8 prism diopters, in the other case from 0 to 3.5. The minimum change in muscle balance was 2 prism diopters (two cases), the maximum was 11 (one case). In the latter the change was from 2 prism diopters exophoria to 9 prism diopters of esophoria, and it is interesting to note that there was no diplopia in this case, and that the patient passed through a stage of orthophoria.

Duction tests were made on three subjects. These were made in the usual manner, a variable prism and a distant fixation light being employed. The results obtained are shown in the accompanying table.

According to the conventional notation, the abduction in all cases was reduced. But duction power can be determined only by allowing for the muscle balance at the time of the test. Making this allowance, the real abduction was very little affected—in A it was actually increased. The real adduction was decreased in each case, in C markedly.

As pointed out by Verhoeff,¹ it is probable that the conventional tests for adduction do not reveal the involuntary adduction (analogous to sursumduction) but chiefly the voluntary convergence power.

In view of the fact that alcohol has little effect on real abduction, it is probable that it depresses the convergence center and has little effect on the involuntary adduction.

It is evident that the diplopia which alcohol produces in normal subjects is due to an increasing esophoria which finally cannot be overcome by the abduction, although this remains almost unchanged. Since alcohol is known to be a depressant, it is not surprising that the real adduction should be reduced, but in view of the latter fact it is indeed surprising that esophoria rather than exophoria should develop.

While no depth perception tests as such were done, it seems probable that the esophoria noted would have a definite effect on depth perception. It would seem that one who drinks frequently would be more likely to educate oneself to allow for changes in distance values under these varying conditions of muscle balance than would the very occasional drinker. It was suggested to me by Dr. Verhoeff that the esophoria would affect chiefly the judgment of absolute distance and have no important effect on that of relative depth.

CONCLUSIONS

Visual tests following the consumption of alcohol by twenty-one normal individuals showed no diminution of visual acuity, visual fields or color vision.

Except in one case, in which the dark adaptation was already abnormally low, conventional tests for dark adaptation showed that alcohol had no appreciable effect on the shape of the recovery curve.

Tests of muscle balance showed no tendency to hyperphoria, but all subjects showed a gradually increasing esophoria. Two subjects progressed to actual convergent strabismus with diplopia in the latter part

Lateral Duction Tests Before and After Drinking

	Phoria	Conventional Abduction	Real Abduction	Conventional Adduction	Real Adduction
A. Preliminary.....	2 Δ exophoria	8 Δ	6 Δ	28 Δ	30 Δ
After 20 ounces..	9 Δ esophoria	0 Δ	9 Δ	32 Δ	23 Δ
B. Preliminary.....	2 Δ esophoria	2.5 Δ	4.5 Δ	40 Δ	38 Δ
After 8 ounces...	4 Δ esophoria	0 Δ	4 Δ	40 Δ	36 Δ
C. Preliminary.....	0 Δ	8 Δ	8 Δ	30 Δ	30 Δ
After 10 ounces..	5.5 Δ esophoria	0.5 Δ	6 Δ	18 Δ	12.5 Δ

adaptation in the preliminary test. Alcohol appeared further to increase slightly the time interval of adaptation in his case.

These tests suggest that alcohol has no effect on dark adaptation when one's margin of safety is high, but it may have a definite effect when through vitamin A deficiency or severe fatigue the reserve is low. Conceivably, alcohol could lower dark adaptation either by hastening the combustion of visual purple or by retarding its formation.

In spite of the fact that the dark adaptation tests employed did not show anything conclusive, I believe that further tests in which the visual purple is more completely broken down and in which a shorter interval is allowed for a first reading should be done. They may show whether a persistence of light scotoma or retardation of perception in the dark may occur—as in seeing objects on the road after being subjected to the glare of oncoming headlights. Until such tests are devised and are sufficiently conclusive, one should not assume that there is no momentary involvement of dark adaptation after the consumption of alcohol. While the tests done in this series show no appreciable change in shape of the recovery curve, there may have been changes in the first portion of the curve which the technic employed was not quick enough to catch. Such retardation, if present, would be extremely hazardous in night driving.

Muscle Balance.—This was determined by the use of a Maddox rod and variable prism. The results of all preliminary tests were well within normal limits—in sixteen subjects there was esophoria of less than 1

1. Verhoeff, F. H.: Hyperphoria Tests Based on a New Principle. Arch. Ophth. 22: 743-759 (Nov.) 1939.

of the tests. One subject had definite exophoria at the outset and therefore passed through a stage of orthophoria before becoming esophoric.

The diplopia that results from alcohol is associated with a reduction, not with an increase, in convergence power and is dependent on the development of esophoria too great to be overcome by the abduction power, although this remains unchanged.

243 Charles Street.

CHRONIC FRIEDLÄNDER INFECTIONS OF THE LUNGS

REPORT OF SEVENTEEN CASES AND OBSERVATIONS
ON THERAPY WITH SULFAPYRIDINE
AND SULFANILAMIDE

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In a recent communication I reported a series of cases of acute Friedländer pneumonia, giving reasons for considering this disease as a distinct and primary form of pneumonia.¹ Before proceeding to a description of chronic lung infections caused by the Friedländer bacillus (*Bacillus mucosus capsulatus*), the essential features of the acute disease will be reviewed briefly.

In common with other pneumonias, the onset is usually sudden, with chills, fever, cough and pain. The clinical course, however, is fulminating and the mortality extremely high. Certain other features serve further to distinguish Friedländer pneumonia from other forms:

1. Pneumonia due to the Friedländer bacillus comprises from 1 to 3 per cent of all pneumonias and occurs almost exclusively in the later decades of life with a considerable preponderance of males over females. It almost never occurs in children.

2. Hemoptysis is a frequent initial symptom in this disease. Herpes is uncommon, but jaundice is a rather frequent accompaniment.

3. Though the lesion is lobar in distribution, the classic signs of consolidation such as bronchial breathing and pectoriloquy are absent in about half the cases. When one observes the heavy, soggy lung at necropsy, the dulness and suppressed breath sounds are readily explained. Involvement of the upper lobe and involvement of more than one lobe are frequent.

4. The temperature is less regular, and low grade fever is more common than in pneumococcal pneumonia.

5. The gross appearance of the sputum generally is characteristic. It is that of a brick-red homogeneous emulsion of blood and mucus, in contrast to the rusty taffy-like sputum of pneumococcal pneumonia. A direct smear of the sputum stained by Gram's method will usually show a predominance of the typical gram-negative bacilli surrounded by a clearer zone representing the capsule. Inoculation of the sputum into the mouse, an animal extremely susceptible to this organism, will invariably confirm the diagnosis.

6. Pure cultures of the Friedländer bacillus are obtained from the sputum, from the lung juice and frequently from the blood cultures.

7. Leukopenia and monocytosis with a shift to the left in the Schilling index are frequent, leukocytosis appearing in the complicated cases.

8. Bacteremia is more frequent but is quantitatively less intense than in pneumococcal pneumonia. The mortality rate is apparently little affected by the absence of bacteremia.

9. Abscess formation is the most frequent complication, empyema and meningitis are less common. The Friedländer bacillus may readily be cultivated from the pus and spinal fluid in such cases.

10. At necropsy the involved lobes are marked chiefly by some degree of softening and necrosis of the lung with the presence of a characteristic dirty, slimy exudate on the cut surface. Culture of the lung, if necropsy is performed soon after death, yields the Friedländer bacillus, and on microscopic section the organisms may be seen as gram-negative encapsulated rods lying free in the alveoli and within the cells.

From the foregoing considerations it will be seen that usually acute Friedländer pneumonia terminates fatally within a relatively short time. With the exception of the very few who recover completely, the surviving patients pass into the chronic stage. Observations on this latter group of lung infections known as chronic Friedländer pneumonia will now be presented.

In contrast to the fulminating and highly fatal character of the acute disease, the chronic Friedländer lung infections run a protracted and relatively benign course, months or years in duration. The Friedländer bacillus shows a marked tendency to cause nonputrid pulmonary necrosis, though it never leads to caseation. Hence, because of the presence of cavities in the lung and because of the frequent upper lobe involvement, the chronic form of the disease is very commonly mistaken for pulmonary tuberculosis.

Although the time element is important in separating the cases into acute and chronic groups, nevertheless, it is difficult to draw a distinct dividing line. Bullowa, Chess and Friedman² report that 75 per cent of their patients with acute Friedländer pneumonia died within eight days and that the average clinical course was less than two weeks. The experience of other authors is similar. My own acute cases followed a course lasting from two to sixteen days. Arbitrarily, therefore, a time limit of four weeks may be allowed beyond which a case should be considered as falling into the chronic group.

For the sake of completeness, it should be mentioned that the Friedländer bacillus not uncommonly is encountered as a secondary invader in the course of other pulmonary infections.³ However, because of limitations of space, such cases are purposely omitted from this presentation. For the same reason, there will be no discussion here of the important and interesting extrapulmonary infections caused by the Friedländer bacillus.

LITERATURE

The importance of the Friedländer bacillus as a cause of chronic lung infections is beginning to receive greater recognition. Recently, Amberson has emphasized that in suspected cases of chronic pulmonary tuberculosis when repeated examinations of sputum reveal no tubercle bacilli, it is important to search for the Friedländer bacillus as a possible causal agent.⁴ Nevertheless, the number of chronic Friedländer lung infections reported in the literature is small.

2. Bullowa, J. G. M.; Chess, Joseph, and Friedman, N. B.: Pneumonia Due to *Bacillus Friedländeri*, *Arch. Int. Med.* **60**: 735 (Nov.) 1937.

3. Belk, W. P.: Pulmonary Infections by Friedländer's Bacillus, *J. Infect. Dis.* **38**: 115 (Feb.) 1926.

4. Amberson, J. Burns: Personal communication to the author.

Read before the Montreal Clinical Society, Montreal, Canada, Nov. 24, 1939.

Owing to lack of space, figures 8, 9, 10, 15, 16 and 17 have been omitted; they are included in the reprints.

From the Fourth Medical Division of Bellevue Hospital, Dr. Charles H. Nammack, director, and the Dr. Simon Baruch Foundation for Research.

Four of the cases presented here were observed in the wards of the Tuberculosis Service, Dr. J. Burns Amberson, director. Certain of the laboratory studies in these four cases and one other were done as part of a study of sulfapyridine therapy conducted by the Bellevue Hospital Pneumonia Investigation.

1. Solomon, Saul: Primary Friedländer Pneumonia, *J. A. M. A.* **108**: 937 (March 20) 1937.

One of the earliest cases was reported by Sisson and Thompson.⁵ This concerned a 31 year old man who developed a bronchopleural fistula and a Friedländer bacillus empyema, making an apparently complete recovery in three months. Belk³ in 1926 reported three cases of chronic pulmonary suppuration due to the Friedländer bacillus and pointed out the possibility of confusion with pulmonary tuberculosis. Stoichitz and Jonnesco⁶ in 1933 observed a patient with lung abscess following tonsillectomy who died after thirty-six days, the blood culture showing Friedländer's bacillus. In 1930 Crohn⁷ reported the case of a man with Friedländer pneumonia and bacteremia who died after an illness of two months, showing at autopsy an ulcerative polypoid endocarditis of the mitral valve with septic infarcts in the spleen, kidneys and intestine.

Sweany, Stadnichenko and Henrichsen⁸ had the opportunity to study one case for twenty-eight months. The patient was a 45 year old man whose illness began suddenly with pneumonia of the right upper lobe. The lesion subsequently spread to the left upper lobe and resulted in bilateral upper lobe cavities closely simulating tuberculosis. The case closely parallels that described by Westermarck⁹ which began as an acute pneumonia but resulted in thin-walled abscesses in both upper lobes, death occurring after seven months of illness. Schapper¹⁰ in 1931 described a similar case in which death followed operation for lung abscess after an illness of three months. Stengel and his associates¹¹ have reported the largest series to date (four cases) and in several publications have outlined the characteristic roentgenologic picture.

INCIDENCE

It is difficult to estimate the incidence of chronic Friedländer pneumonia. For comparative purposes, it may be noted that it is less common than acute Friedländer pneumonia, which in turn comprises approximately from 1 to 3 per cent of all adult cases of pneumonia. It is probable, however, that the disease is more common than is generally supposed since, as stated, this condition is frequently mistaken for other chronic lung diseases.¹²

Chronic Friedländer pneumonia occurs chiefly in the later decades of life. The patients in this series ranged in age from 34 to 69 years, the average age being 49 years. No case has yet been observed in childhood. The disease is more frequent in males, twelve of the patients in this series being males and five females. All the patients were white. The seasonal incidence is not striking. Ten cases occurred in the six inclement months from November to April inclusive and only seven in the remaining six months.

Alcoholism as a predisposing factor was recorded in nine cases. The association between cirrhosis of the liver and Friedländer infection is not uncommon. Occupation apparently plays no role. In two of the cases the pneumonia followed submersion (drowning) and parturition respectively.

CLINICAL COURSE

With only three exceptions all the cases began acutely with a combination of the following symptoms: general malaise, chills, fever, pleuritic pain and cough. Gastro-intestinal symptoms occurred in only three cases and in one of them was due to an associated hepatic condition.

The temperature was quite irregular, ranging from normal to 105 F. In several cases in which suppuration was severe, there were marked diurnal variations in the fever. In some instances, varying periods of normal temperature alternated with febrile episodes. The temperature came down by lysis in seven of the nonfatal cases, on the average about the forty-fifth day of illness, though low grade pyrexia frequently persisted afterward for weeks or months. In three of the four cases treated with sulfapyridine, the fever dropped sharply within twenty-four to seventy-two hours and in one instance the fever came down slowly in ten days. The only patient who received sulfanilamide had a lysis after seven days of treatment. In the four fatal cases, death occurred after thirty-six days, forty-three days, thirty days and fourteen months respectively.

For the purpose of convenience the entire illness may be divided into two phases: first the acute stage, where there ensues in the majority of cases an apurid necrosis of the lung and quite frequently pleural effusion, whether purulent or serous. Second, if the patient survives, there occurs the stage of chronic pulmonary suppuration with one or more thin-walled abscesses, bronchiectasis or fibrosis or a combination of these processes, which so far as I know may persist indefinitely with exacerbations and remissions. Death may occur at any point in the clinical course but occasionally, if the lesion is not too extensive, there may be apparently complete resolution.

During the early stages, most of the patients were severely ill and prostrated and were in effect suffering from acute Friedländer pneumonia. After a varying period, the illness assumed the features of chronicity, lasting anywhere from one month to more than three years as far as could be determined. Moreover, there were individuals who recovered and were discharged with incomplete clearing of the lungs only to be readmitted after a lapse of months with a recurrence or an exacerbation of the disease. It should be emphasized, therefore, since most of the illnesses began as pneumonia, that patients who have recovered from acute Friedländer pneumonia should not be dismissed from observation too soon because of the strong possibility of the development of chronic lung changes.

Herpes was noted in only one case. No petechiae or other cutaneous lesions were seen. Jaundice was noted in only two cases. In one it was associated with a subdiaphragmatic abscess, in the other with cirrhosis of the liver. None of the patients showed clubbing of the digits.

While no extensive immunity studies were carried out, an attempt was made in six nonfatal cases to determine at different intervals in the course of the disease the presence of immune bodies as exemplified by agglu-

5. Sisson, W. B., and Thompson, C. B.: Friedländer Bacillus Pneumonia with Report of Cases, *Am. J. M. Sc.* 150: 713 (Nov.) 1915.

6. Stoichitz, N. N., and Jonnesco, D.: Abscès du poudon et septémie à pneumobacilles de Friedländer, *Arch. méd.-chir. de l'app. respir.* 5: 534, 1933.

7. Crohn, W. H.: Septische Endocarditis durch Bacillus Friedländer, *Med. Klin.* 26: 552 (April 11) 1930.

8. Sweany, H. C., Stadnichenko, Asya, and Henrichsen, K. J.: Multiple Pulmonary Abscesses Simulating Tuberculosis, *Arch. Int. Med.* 47: 565 (April) 1931.

9. Westermarck, N.: Pneumonia with Friedländer's Bacillus Simulating Tuberculosis, *Acta radiol.* 7: 626, 1926.

10. Schapper, Kurt: Ueber Friedländer-Pneumonien, *Beitr. z. Klin. d. Tuberk.* 75: 741, 1931.

11. Stengel, A.; Kornblum, Karl, and Collins, L. H., Jr.: Friedländer's Pneumonia, *Tr. A. Am. Physicians* 43: 326, 1928. Kornblum, Karl: Roentgen Ray Diagnosis of Pulmonary Infections with the Friedländer Bacillus, *Am. J. Roentgenol.* 19: 513 (June) 1928. Collins, L. H., and Kornblum, Karl: Chronic Pulmonary Infections Due to the Friedländer Bacillus, *Arch. Int. Med.* 43: 352 (March) 1929. Collins, L. H.: Chronic Pulmonary Infections Due to the Friedländer Bacillus, *Arch. Int. Med.* 55: 235 (Aug.) 1936.

12. Since this article was completed, I have seen six additional cases which are not included in this report but which are similar in all important respects to the cases in this series.

tinins and capsule-swelling substances.¹³ In general they were found to appear in the blood in the recovery phase during the first weeks of illness and to persist for from one to three weeks or longer.

Only four of the seventeen patients in this series died, a mortality of 23.5 per cent as compared with 97 per cent in the acute group. However, these statistics are not final since several patients have not returned for observation after leaving the hospital. Four of the patients have not yet been discharged, though it appears

As shown in table 1, upper lobe lesions occurred in ten cases. In four other cases, the upper lobes were involved in conjunction with other lobes. Thus in fourteen cases (82 per cent) there was upper lobe involvement. Multiple lobe involvement occurred in five cases (30 per cent), although in only two cases of this series was there infection of both lungs.

SPUTUM

As seen from table 2, bloody sputum or gross hemoptysis was noted in five cases. In six others the

TABLE 1.—*Clinical Course, Treatment and Results in Seventeen Cases of Chronic Friedländer Pneumonia*

Case	Age	Sex	Onset	Lobes Involved	Course	Organism	Where Found	Complications	Treatment	Outcome	Comment
1. G. A.	48	M	Sudden; chills, pleurisy, bloody sputum	LUL RUL	Virulent and fatal	F.B.A.	Sputum	Lung abscess	Brscopy., gualacoi	Death on 36th day, autopsy	Moderate alcoholism
2. A. H.	45	F	Sudden; chills, pleurisy, bloody sputum	LUL	Recurring attacks of pneumonia	F.B.	Sputum, b.c.	Abscesses LUL, hemoptyses	Symptomatic	Complete cure after 3 yrs.	Alcoholism, early cirrhosis
3. D. U.	55	M	Insidious onset, fever, pleurisy	RLL	Severe with foci of supuration	F.B.	Empyema	Empyema (F.B.), subd. abscess (B. coli)	Thoracotomy, drainage of subd. abscess	Death on 43d day	History of chronic biliary infection
4. N. K.	34	F	Sudden; chills, pleurisy, bloody sputum	Entire R. lung, LLL	Rapid downhill course	F.B.	Sputum	Spread from RUL to both lower lobes	Symptomatic	Death on 30th day	
5. M. B.	62	F	Sick 1 year; fever, cough, pleurisy	RUL	Gradual wasting; prolonged suppuration	F.B.	Sputum, empyema	Abscess, loculated empyema	Brscopy., thoracotomy	Death after 14 months	Moderate alcoholism
6. A. W.	39	M	Fever, pleurisy, mucopurulent sputum	LLL	Mild course	F.B.	Sputum, effusion	Serous effusion, incomplete resolution	Thoracentesis	Left hospital against advice	Alcoholism, monocytes 8%
7. T. M.	69	M	Acute; pleurisy and thick red sputum	Entire L. lung	Moderately severe course	F.B.	Sputum	Abscess	Symptomatic	Same	
8. G. P.	36	F	Onset postpartum with pleurisy, chills	Entire R. lung	Severe course, subsided spontaneously	F.B.	Sputum, effusion	Pleural effusion (serous)	Thoracentesis	Lysis 48th day, discharged 64th day	Monocytes 15%
9. J. B.	50	M	Chills, pleurisy, epigastric pain, red sputum	LLL	Same	F.B.	Sputum	Incomplete resolution	Symptomatic	Lysis 40th day, discharged 50th day	Alcoholism
10. J. M.	42	M	Following submersion; pleurisy, characteristic sputum	RUL, LLL	Same	F.B.C.	Sputum, b.c. (25 colonies)	Serous effusion	Symptomatic	Recovered	Alcoholism, monocytes 6%
11. J. S.	60	M	Acute; chills, pleurisy, bloody sputum	RUL	Recurring attacks of pneumonia	F.B.A.	Sputum, lung fluid	Suppuration and bronchiectasis	Symptomatic	Recovery, residual bronchiectasis	
12. M. C.	50	M	Acute; chills, pleurisy, bloody sputum	RUL	Severe; abscess and copious sputum	F.B.A.	Sputum, pus obtained by brscopy.	Abscess	Sfp., brscopy.	Recovery with cavity	Alcoholism, fatty liver
13. J. M.	41	M	Acute; chills, pleurisy; bloody sputum	RUL	Severe	F.B.B.	Sputum, b.c.	Abscess	Sfp.	.....	Alcoholism, cirrhosis, ascites
14. E. M.	46	F	Sudden; chills, pleurisy, thick yellow sputum	LUL	Severe at first, crisis in 24 hrs.	F.B.A.	Sputum, empyema	Abscess, empyema necessitatis	Sfp., brscopy., thoracotomy	Recovery with cavity and fistula	Past history of pneumonia and empyema
15. J. A.	63	..	Pleurisy, fever, characteristic sputum	LUL	Severe; crisis 3 days after admission	F.B.A.	Sputum, empyema	Abscess, empyema	Same	.....	Alcoholism
16. A. G.	50	M	Acute; chills, pleurisy, scanty pink sputum	RUL	Severe with suppuration, purulent sputum	F.B.A.	Sputum, b.c.	Abscess	Sulfanilamide	Recovery with residual abscess	Alcoholism
17. A. F.	65	M	Griplike onset; fever, brown sputum	LUL	Lung abscess, prolonged pyrexia	F.B.A.	Sputum, lung abscess	Abscess	Thoracotomy, brscopy.	Abscess and fistula	

Abbreviations: M = male; F = female; LUL = left upper lobe; LLL = left lower lobe, etc.; F.B. = Friedländer bacillus; A, B and C refer to types; subd. = subdiaphragmatic; b. c. = blood culture; brscopy. = bronchoscopy; sfp. = sulfapyridine; pne. = pneumococci; staph. = staphylococci; strep. = streptococci; spir., fus. b. = spirochetes and fusiform bacilli.

likely that they will recover. Five others have returned to their usual mode of life and are followed at intervals in the clinic.

DISTRIBUTION OF THE PULMONARY LESION

In only one case was the lesion bronchopneumonic while in sixteen it was predominantly lobar or confluent lobular in distribution. In several of these latter cases, however, in addition to the lobar lesion there was either simultaneous or subsequent patchy infection of other areas.

13. These tests were carried out with the technical assistance of Miss Ruth Egan.

sputum was at the onset the characteristic homogeneous, brick-red mixture of blood and mucus which has been described in the introductory paragraphs. It is important to note that the character of the sputum is not constant but will change during the course of the disease. It is generally bloody and mucoid during the early stages; later it becomes mucopurulent and turns either green or yellow. Hemoptysis may occur at any stage of the illness, that during the early phases being due to pulmonary congestion and necrosis and later in the disease to lung abscess or bronchiectasis. It is not usual for the sputum to become foul,

and such an occurrence is indicative of secondary invasion by anaerobes.

If a direct smear of the sputum is stained by Gram's method, it is frequently possible to recognize the predominant organism as large gram-negative rods sur-

TABLE 2.—Gross Appearance and Cultural Characteristics of the Sputum

Case	Gross Appearance of Sputum		Bacteriologic Examination		Hem-opty-sis	Tubercle Bacilli	Comment
	Early	Late	Early	Late			
1. G. A.	Red, mucoid	Copious, foul purulent	Pure F.B.A.	F.B.A., pne., spiro., fus. b.	No	Neg.	Secondary anaerobic infection
2. A. H.	Red, mucoid	Thin, brown, foul	Pure F.B.	F.B., pne., staph. etc.	Sev-eral	Neg.	Lung abscess, bacteremia
3. D. U.	No sputum		Pure F.B. isolated twice from empyema		No	.....	Subd. abscess (B. coli)
4. N. K.	Profuse, red, mucoid	Thick, brown	Not examined	F.B. pure growth	No	Neg.	.....
5. M. B.	Purulent, sometimes bloody	Thick, brown	Not examined	F.B. pure growth	Sev-eral	Neg.	Pure F.B. from empyema and lung abscess
6. A. W.	Thick, mucopurulent	Thick, brown	Not examined	F.B. pure growth	No	Neg.	Pure F.B. from pleural effusion
7. T. M.	Thick, mucoid, bloody	Thick, brown, foul	Not examined	F.B. pure growth	No	Neg.	Lung abscess
8. G. P.	Scanty, mucoid	None	Pure F.B.	.....	No	Neg.	Pure F.B. from pleural fluid
9. J. B.	Thick, brick-red, mucoid	Mucopurulent	Pure F.B.	F.B. and pne.	No	Neg.	.....
10. J. M.	Thick, brick-red, mucoid	Scanty	Pure F.B.C.	F.B. and pne.	Yes	Neg.	Bacteremia, 25 colonies
11. J. S.	Mucoid, yellow	Copious, mucopurulent	Pure F.B.A.	F.B.A., pne., staph., etc.	No	Neg.	Pure F.B.A. from lung juice
12. M. C.	Mucoid, bloody	Copious, mucopurulent	F.B.A., few staph.	F.B.A., pne., staph., etc.	Yes	Neg.	Lung abscess, pure F.B.A. obtained by biopsy.
13. J. M.	Mucoid, bloody	Copious, mucopurulent	Pure F.B.B.	F.B.B., pne., staph., etc.	No	Neg.	Bacteremia
14. E. M.	Thick, yellow	Scanty, mucoid	F.B.A., pne.	F.B.A., pne. type X	No	Neg.	F.B.A. from empyema
15. J. A.	Copious, mucoid, red-brown	Copious, mucopurulent, brown	Pure F.B.A.	F.B.A. and pne.	Yes	Neg.	F.B.A. from empyema
16. A. G.	Scanty, salmon-colored	Thin, mucopurulent	Pure F.B.A.	F.B.A. staph., pne., strep., etc.	No	Neg.	Bacteremia
17. A. F.	Brown, mucoid	Green, mucopurulent	F.B.A., pne.	F.B.A., staph., pne., strep., etc.	No	Neg.	F.B.A. from lung abscess

For key to abbreviations see table 1.

rounded by a refractile zone representing the capsule. After mouse passage or culture in laboratory mediums there generally occurs a change in the morphology, and the rods become shorter and even coccoid.

Analysis of table 2 shows clearly that during the early stages of the infection the Friedländer organism will usually be found in pure culture in the sputum, though in some instances it may become contaminated with other bacteria from the upper respiratory tract.

The most certain method of identifying the organism is to inoculate the peritoneal cavity of a white mouse with a saline suspension of the sputum and examine bacteriologically the peritoneal fluid and the heart's blood or the brain of the mouse within twelve to twenty-four hours. Furthermore, if a loopful of sputum is streaked on a blood agar plate, the great majority of the colonies will prove to be Friedländer bacilli. By either method, the Friedländer bacillus can thus be recovered in pure culture and the organism may be further identified by agglutination tests or by the capsule-swelling method as belonging to group A, B or C. In all but one of the cases, positive evidence was obtained by discovery of the Friedländer bacillus in the sputum on one or more occasions and in nine of the cases the organism was typed. In seven of these instances a type A bacillus was found, in one a type B organism was isolated, and in still another case type C was the responsible organism.

It should be emphasized here that in the later stages of the illness, if abscess or bronchiectasis becomes established in the involved lung, these mechanical defects offer a nidus for secondary infection. Also, owing perhaps to immune processes, there is frequently a diminution in the number and virulence of the Friedländer bacilli, which become overgrown with secondary invaders. The remaining Friedländer organisms may become so attenuated that they are not virulent for mice, and only culture on an agar pour plate will reveal their presence.

BACTERIOLOGY OF LUNG FLUID, PLEURAL FLUID AND SPUTUM OBTAINED BY BRONCHOSCOPY

Since the sputum may become contaminated by organisms from the upper respiratory tract, it is desirable, whenever possible, to secure material for culture from other sources. Lung suction was done in one patient. The Friedländer bacillus type A was recovered on three occasions from the lung fluid of this individual during a period of several months. On eight other patients thoracentesis was done because the clinical observations suggested fluid. In four cases thoracentesis yielded pus which was found to contain the Friedländer bacillus. In the four other cases a nonpurulent pleural effusion was withdrawn which in two of the cases contained the Friedländer organism and in the other two was sterile.

Bronchoscopy was performed on three patients. Culture of the sputum from the bronchus of the involved lobe yielded the Friedländer bacillus in each instance.

BACTEREMIA AND ITS RELATION TO MORTALITY

Blood cultures were made for thirteen patients of this series, several cultures usually being made in each case. As shown in table 3, only four patients had bacteremia; the blood stream of three of these was only mildly invaded and quickly became sterile, in one instance after sulfapyridine therapy and in another after the use of sulfanilamide. In one other nonfatal case as many as 25 colonies per cubic centimeter of blood were found. However, in this instance, the disease was due to a type C organism which apparently is less virulent than the more common type A.

Analysis of the data contained in table 3 discloses first a low mortality in the entire group of chronic Friedländer lung infections—23.5 per cent as compared with the 97 per cent mortality noted in the acute cases. Second, bacteremia is relatively infrequent in chronic Friedländer pneumonia, occurring in 31 per cent of

the cases as compared with 70 per cent in the acute group. Third, as in acute Friedländer pneumonia, the blood stream invasion is generally mild and does not apparently play an important role as a cause of death. The recent case report,¹⁴ therefore, of a recovery from Friedländer bacteremia without pneumonia following sulfapyridine therapy should not be hailed with too great enthusiasm.

BLOOD CELL CHANGES

White cell counts were done in sixteen cases, in twelve of which serial determinations were made. The count ranged from 4,200 to 33,800. In the majority of the cases there was a moderate degree of leukocytosis during the acute phases of the illness. The highest count (33,800) was reached in a case complicated by both lung abscess and empyema. In only three cases was there a true leukopenia, which contrasts with the data in the previously reported acute group, in which leukopenia occurred at some stage during the period of observation in about one half of the cases. The percentage of polymorphonuclears varied from 32 to 96 per cent of the total, being usually elevated with a shift to the left in the Schilling index during the acute phase of the illness. The monocytes ranged from 0 to 20 per cent. There were five cases (31 per cent) in which the monocytes reached 6 per cent or more during the period of observation.

COMPLICATIONS

Complications were frequent, in fact almost universal, in this series and were in the main limited to the chest. Lung abscess was demonstrated roentgenologically in ten cases, death occurring in two of these during the period of observation. In four instances the diagnosis was confirmed at operation and in one at necropsy. Abscess formation was generally marked by a change in the character of the sputum, which became copious and mucopurulent but not, as a rule, foul.

In three of the cases of lung abscess there developed an encapsulated empyema from which in each instance the Friedländer bacillus was isolated in pure culture on one or more occasions. Empyema occurred in one other case, unassociated with lung abscess.

The pus in the empyema cases was thick, yellowish green or creamy; it contained a predominance of polymorphonuclear leukocytes and when first discovered yielded Friedländer bacilli in pure culture. Subsequently, in two of the cases other organisms were found, the assumption being that they were secondary invaders.

Pleural effusions of a serous nature were noted in four cases. In two of these the effusions were large, 1,500 cc. and 750 cc. of fluid respectively being removed by thoracentesis and in both cases yielding the Friedländer organism in pure culture. In the third case, the serous effusion was encapsulated and the fluid sterile. However, this patient showed lung abscess and loculated empyema in both of which the Friedländer bacillus was demonstrated. In the fourth case the effusion occurred two months after the onset of illness and was small in amount and sterile.

A rather frequent sequela was pulmonary fibrosis and delayed resolution, which was observed in four cases. In one instance this was associated with a purulent bronchiectasis as demonstrated in bronchograms (figs. 6 and 7).

14. Meyer, K. A., and Amtman, Leo: Treatment of Friedländer's Septicemia by Sulfapyridine with Recovery, *J. A. M. A.* 113: 1641 (Oct. 28) 1939.

Severe hemoptysis was observed in only one case. Delirium occurred in only one case and was attributed to associated chronic alcoholism. Meningitis did not occur in this series. The unusual complication of axillary vein phlebitis occurred in two patients, being in both instances associated with abscess and encapsulated empyema on the same side. The phlebitis subsided in both cases after sulfapyridine therapy and surgical drainage of the chest, but in one case it was followed by an acute inflammatory arthritis of the wrist on the same side.

X-RAY STUDIES

It was possible in most of the cases of this series to obtain serial roentgenograms at various stages of the disease. The earliest changes noted are those of lobar or confluent lobular consolidation, followed in the majority of cases by abscess formation or by bronchiectasis. Pleural effusion either serous or purulent is common. There is frequently a considerable degree of pulmonary fibrosis as evidenced by x-rays. Lung abscesses, once established, tend to persist indefinitely if a fatal issue is avoided. Complete clearing, however, does occasionally occur.

Kornblum and his associates¹¹ describe four phases, as observed by serial roentgenograms: first, the stage

TABLE 3.—*Relation of Bacteremia to Mortality*

Total number of cases.....	17
Deaths.....	4
Mortality rate.....	23.5%
Number of cases in which blood culture was done.....	13
Number of cases with bacteremia.....	4
Number of cases with bacteremia in which death occurred.....	0
Number of cases without bacteremia.....	9
Number of cases without bacteremia in which death occurred.....	2
Mortality rate of nonbacteremic cases.....	23%

of primary bronchopneumonia; second, coalescence to form a pseudo lobar pneumonia; third, pulmonary necrosis, and finally the formation of numerous irregular cavities of various sizes. While such a classification has the merit of convenience, it is by no means true that chronic Friedländer pneumonias necessarily follow this course. On the contrary, in many instances the early manifestations are those of a massive dense shadow in the involved lung, frequently suggestive of encapsulated fluid. Moreover, abscess formation is not universal, since in certain cases of acute Friedländer pneumonia there is recovery with complete clearing of the lesion as shown by roentgenogram. In the majority, however, abscesses, bronchiectasis or fibrosis develops and these latter changes may persist for years or even for the duration of the patient's life. It is not my impression that the roentgenologic changes at any stage in the course of this disease are by themselves pathognomonic, though serial roentgenograms when considered in conjunction with the history and clinical course are most helpful in pointing to the diagnosis.

DIFFERENTIAL DIAGNOSIS

During the acute stage, the disease resembles pneumococcal pneumonia with the exception that in a certain percentage of cases the sputum has the characteristics of the acute Friedländer pneumonia. There are other clinical differences, already enumerated, and careful bacteriologic study will conclusively distinguish this disease from the pneumococcal infections.

It is during the succeeding phases that an error is most likely to be made. If pulmonary suppuration

occurs and is followed by secondary anaerobic infection with the production of foul sputum, it usually leads to a diagnosis of putrid lung abscess. However, if the sputum is cultured by streaking on a blood agar plate or by mouse inoculation, it is possible correctly to reconstruct the pathogenesis of the illness. Fortunately, in most instances the pulmonary necrosis is nonputrid.

Perhaps the commonest mistake is to diagnose the condition as chronic pulmonary tuberculosis because of the bloody mucopurulent sputum and the x-ray appearance of an upper lobe lesion associated with cavities and pulmonary fibrosis with or without a certain degree of lung shrinkage. However, repeated examinations of concentrated specimens of sputum and guinea pig inoculation will not show tubercle bacilli. By detailed cultural analysis, it is generally possible to isolate the Friedländer organism in pure or mixed culture. In some cases the original organism may disappear, leaving behind merely cavities in one or more lobes. If there are no bacteriologic studies preceding this stage, it is impossible to prove the diagnosis. I have the impression that this is not uncommon.

In some instances, the disease has been mistaken for carcinoma of the bronchus. Bronchoscopic biopsy in such cases will reveal only granulation tissue, and further study of the sputum and the clinical course will demonstrate the true nature of the disease.

TREATMENT

Treatment of the acute illness was in most of the cases symptomatic, specific horse serum not being employed because of the disappointing results observed with its use in the acute disease.¹ Bed rest, expectorants and general nursing care constituted the main features of therapy. Complications were treated by the necessary special measures.

Of the ten patients with lung abscess, three were treated symptomatically with postural drainage and bronchoscopy. Two patients recovered and the third died. Two patients with lung abscess who received sulfapyridine and one who received sulfanilamide recovered. Four other patients with lung abscess, in three instances complicated by encapsulated empyema, were treated surgically. Two of them were given sulfapyridine and the lesions are still draining but the patients appear to be recovering. Of the two who did not receive sulfapyridine one died and the other still has a draining fistula.

Empyema occurred in four cases with the development of thick yellow pus which required thoracotomy with rib resection. Two of the patients, as already noted, were treated with sulfapyridine and recovered, and the two other patients died.

While each case should be considered on its merits, it is my impression that surgical drainage of Friedländer lung abscesses should be avoided whenever possible. The abscess will generally drain adequately through the bronchus, particularly if aided by postural drainage and repeated bronchoscopies. Moreover, in most cases the results with surgical therapy are not striking and the resultant fistulas seem to drain interminably.

As may be gathered from foregoing statements, four of the patients were treated with sulfapyridine. Two Gm. of the drug was given at the start, followed by 1 Gm. every four hours till improvement was noted. All four of these patients recovered, one of them despite the presence of bacteremia. It is difficult to evaluate the effectiveness of sulfapyridine with such a small number

of cases, nor are there, to the best of my knowledge, any previous reports in the literature dealing with the use of sulfapyridine in this disease. The mortality rate in the untreated group was 31 per cent while none of the treated patients died, which in itself is encouraging. It would appear that the drug was most useful in permitting survival during the acute stage. There was, however, little other evident effect on the clinical course, since in three of the cases during the course of therapy suppuration and abscess formation occurred.¹⁵ In the fourth, this process was already well established when treatment was begun. While the results with sulfapyridine are still inconclusive, one should, nevertheless, for the present accept the remedy as the most promising yet advanced for the treatment of this disease.

One bacteremic patient was treated with sulfanilamide, a total of 120 Gm. being administered. This man recovered and was discharged though he too had multiple lung abscesses.

REPORT OF CASES

The following six protocols are selected as best illustrating the salient features of the disease:

CASE 1.—G. A., a white man aged 48, became ill suddenly, being awakened by a sharp pain in the left chest with chills, fever and bloody sputum. When admitted to Bellevue Hospital,

March 11, 1934, on the seventeenth day of disease, he appeared poorly nourished, dyspneic and acutely ill with consolidation of the left upper lobe. During the first ten days, several examinations of the sputum showed pure Friedländer bacilli type A, no tubercle bacilli being found. The sputum, at first mucoid and bloody, became abundant, foul and purulent by the twenty-ninth day owing to secondary anaerobic infection. The sputum retained this character



Fig. 1 (case 1).—The thirty-fourth day of disease, multiple abscesses of the left upper lobe with spread of infection to the right upper lobe.

throughout the remainder of the illness, with the quantity varying from 20 to 100 cc. in twenty-four hours.

Fluoroscopic study on the thirtieth day showed a lung abscess in the left upper lobe with a shifting fluid level. X-ray films four days later (fig. 1) showed multiple abscesses and a spread of the infection to the right upper lobe. The patient was examined by bronchoscope on the thirty-second day, and a large plug of thick foul mucopus was aspirated from the bronchus of the left upper lobe. Blood cultures were repeatedly sterile. The white blood cell count on the twenty-fifth day was 7,850 with 68 per cent polymorphonuclears and 32 per cent lymphocytes, and on the thirty-second day it was 4,700 with 32 per cent polymorphonuclears and 68 per cent lymphocytes. The temperature was irregular, ranging from 100 to 104 F. with marked diurnal variations in the last week of illness. Treatment consisted of postural drainage, intravenous guaicol therapy and bronchoscopic procedure, but the patient failed to respond, death occurring on the thirty-sixth day of illness.

At autopsy the left upper lobe was gray and consolidated, containing a large multiloculated abscess 8 cm. in diameter and

15. Recently a woman aged 72 with Friedländer pneumonia of the right upper lobe was treated with sulfapyridine by Dr. H. K. Ensworth in the service of Dr. Asa Lincoln at Bellevue Hospital and made a complete recovery within ten days with no sequelae. Possibly the fact that treatment was begun only a few hours after onset contributed to her unusually favorable response.

partly full of green viscid pus, the wall being gray, necrotic and fibrous. The right upper lobe was consolidated, and both lower lobes were congested.

CASE 2.—J. S., a white man aged 72, awakened from sleep the morning before admission with fever, general malaise and cough with bloody phlegm. He was admitted Oct. 25, 1937, appearing acutely ill, dyspneic and cyanotic, with a fever of 103 F. and consolidation of the right upper lobe. A roentgeno-

gram again acutely ill and dyspneic with a temperature of 103 F. and the classic signs of consolidation. On the following day the temperature fell to 99 F. A roentgenogram taken February 3 (fig. 4) showed consolidation of the right upper lobe.

The sputum typing on two occasions showed a predominance of Friedländer bacilli type A, and a few pneumococci. Numerous examinations of concentrated specimens of sputum yielded no tubercle bacilli. Lung section was performed February 11,



Fig. 2 (case 2).—Oct. 27, 1937, the second day of illness, Friedländer pneumonia in the right upper lobe.

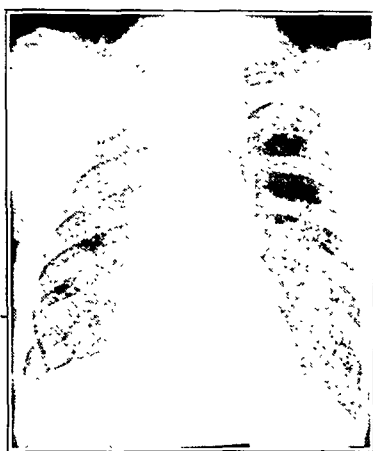


Fig. 3 (case 2).—November 22, showing considerable resolution.

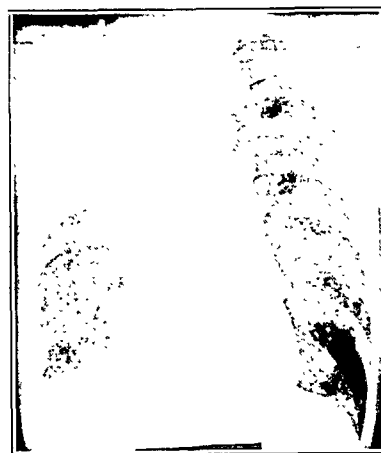


Fig. 4 (case 2).—Feb. 3, 1938, fresh consolidation in the right upper lobe.

gram (fig. 2) taken October 27 showed irregular consolidation confined to the right upper lobe, as well as old pleural thickening and emphysema.

The sputum was thick, brown and mucoid, and a direct smear showed many gram-negative encapsulated bacilli (Friedländer). The sputum typing yielded Friedländer bacilli type A, and the sputum culture showed a predominance of Friedländer organisms with a few unclassified pneumococci. Lung suction with culture of the lung fluid yielded Friedländer bacilli type A in pure culture.

yielding the Friedländer bacillus type A and a few contaminants (staphylococci).

Serial x-ray studies, of which figure 5 (March 2) is representative, showed progressive clearing of the lesion. Because of continued expectoration of considerable mucopurulent sputum a bronchogram was made, which showed a normal bronchial tree in the lower lobes. However, the bronchogram of the right upper lobe (figs. 6 and 7) showed bronchiectasis in the posterior portion of the right upper lobe. The patient was discharged April 15, with residual signs of infiltration in the



Fig. 5 (case 2).—March 2, partial resolution.



Figure 6.



Figure 7.

Figs. 6 and 7 (case 2).—March 8, bronchogram demonstrating bronchiectasis of the right upper lobe.

The patient was treated symptomatically and in three days the temperature fell by crisis. However, he continued to raise a green, mucopurulent sputum which remained negative for tubercle bacilli and still contained the Friedländer bacillus as the predominant organism. A roentgenogram taken November 22 (fig. 3) showed considerable clearing of the pneumonia. He was discharged December 1 to a convalescent home, although his lesion had not completely resolved.

He was readmitted Feb. 3, 1938, stating that in the interval he had been troubled by dull pain in the right side of the chest and cough with copious green sputum. Three days before his readmission he had chills and a sudden rise in fever. He was

right upper lobe and is still under observation in the chest clinic of the Fourth Medical Division of Bellevue Hospital. There is dullness over the right upper lobe but no rales. A roentgenogram made Nov. 3, 1939 (fig. 8), shows infiltration and residual iodized oil in the right upper lobe. He raises several ounces daily of thick mucopurulent sputum which is consistently negative for tubercle bacilli. Culture of the sputum on several occasions has yielded Friedländer bacilli type A mixed with other organisms (streptococci, staphylococci and diphtheroids). The symptoms mentioned, however, are not troublesome and he is able to continue in his occupation as an orderly.

CASE 3.—M. C., a white man aged 50, had a respiratory infection in May 1938. A routine roentgenogram (fig. 9) in the clinic showed no disease of the lungs.

June 10, 1939, he had a sudden sharp pain in the right side of the chest, chills and fever, and raised mucoid bloody sputum. He was admitted June 18, appearing acutely ill with a fever of 103 F. There was dullness in the upper third of the right side of the chest with suppressed breath sounds and a few fine moist rales. The rest of the examination was negative except for moderate enlargement of the liver, attributed to fatty degeneration because of the history of alcoholism. June 19 a roentgenogram (fig. 10) showed a large wedge-shaped area of consolidation in the midzone of the right lung, and the lateral view showed this lesion to be limited to the right upper lobe.

The sputum was thick, brown and mucoid and when cultured showed a preponderance of Friedländer bacilli with also some staphylococci, streptococci and a few unclassified pneumococci. However, when inoculated into a mouse, a pure culture of Friedländer bacillus type A was recovered from the peritoneal cavity and the brain of the mouse. This was repeated June 20 and the Friedländer organisms and a few pneumococci type XI were recovered from the peritoneal cavity of the mouse. July 11, bronchoscopic examination revealed an inflamed bronchus in the right upper lobe with a large amount of non-foul mucopurulent sputum coming from this bronchus. This was not cultured. The bronchoscopic procedure was repeated August

(fig. 14). The patient was asymptomatic, and he was discharged to a convalescent home. He was seen again Jan. 20, 1940, and the roentgenogram, not reproduced here, showed no appreciable change.

CASE 4.¹⁶—J. M., a 41 year old white man, became ill six days before admission with an infection of the upper respiratory tract, followed by sharp pain in the right side of the chest and blood-streaked sputum. He was admitted Nov. 2, 1939, appearing acutely ill with a temperature of 104 F. The sputum was the characteristic mixture of mucus and blood. There was consolidation of the right upper lobe (fig. 15).

The patient was icteric; the liver was enlarged and ascites was present. Dr. William Asterid, who had observed this patient for some years previously, stated that the diagnosis of hepatic cirrhosis had been made in 1935 and that up to the time of the present illness there was no pulmonary disease.

The sputum on admission and several days later showed a pure growth of the Friedländer bacillus type B. The blood culture made on admission showed one colony of this bacillus. The cultures November 4 and 5 were sterile but on November 6 there was again a growth of the Friedländer bacillus type B in the broth despite the fact that he was receiving sulfapyridine.

Sulfapyridine therapy was begun on admission, 2 Gm. being given at once and 1 Gm. every four hours until November 13, when the dose was halved and continued for four more days. He received a total of 80 Gm. of the drug.

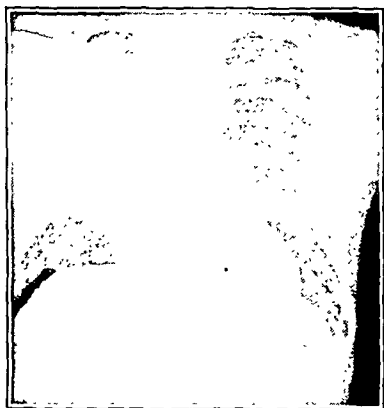


Fig. 11 (case 3).—June 23.



Fig. 12 (case 3).—July 7, abscess with a fluid level.

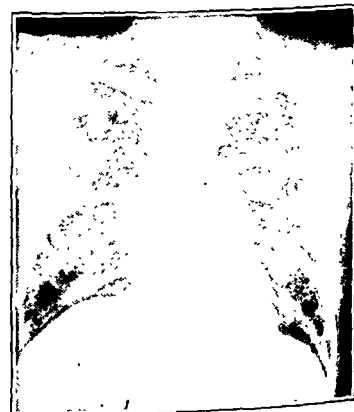


Fig. 13 (case 3).—August 31, clearing of the pneumonic zone. The abscess is large but empty.

4 with the aspiration of scanty thick sputum from the bronchus of the right upper lobe; on culture this yielded pure Friedländer bacillus type A. Bronchoscopy and culture of the material obtained were done one week later with the same result.

The clinical course was severe during the first two weeks. There were signs of consolidation of the right upper lobe and an x-ray film June 23 (fig. 11) showed a dense homogeneous shadow with a convex lower border as if there might be an encapsulated effusion. Exploratory thoracentesis yielded no fluid.

Sulfapyridine was employed, 1 Gm. being given every four hours for ten days, after which the temperature came down by lysis and the drug was discontinued. He received a total of 55 Gm. No toxic symptoms were noted.

The white cells on admission numbered 13,200 with a shift to the left. Within a few days the count rose to 22,750 with a greater shift to the left. Following this there was a gradual fall in the white cell count. The red cells and hemoglobin were moderately low on admission and did not rise till after the acute phase passed. The erythrocyte sedimentation rate (Westergren) averaged 40 mm. during the acute stage of the illness and gradually came down to normal.

Serial x-ray studies (figs. 12 and 13) showed abscess formation with fluid level although the sputum was never foul. There was gradual clearing of the pneumonic zone surrounding the abscess. Agglutinins against the Friedländer bacillus type A appeared in the blood. The cavity decreased in size progressively, and the roentgenogram made October 23 showed merely an area of infiltration in the second and third right interspaces which may represent either a residual cavity or bronchiectasis

The patient gradually improved and the temperature fell by lysis November 5, although he appeared toxic for some weeks after. The pneumonic area began to slough out and a definite lung abscess developed in the periphery of the second interspace (fig. 16). The character of the sputum changed, becoming copious and mucoid and containing mixed organisms as well as the Friedländer bacillus. Agglutinins against the Friedländer type B organism were present November 6 and persisted for several weeks. It is of interest that for a short time agglutinins were also present for the pneumococcus type II, whose capsule is closely related to that of the Friedländer type B organism.

The white cells on admission numbered 4,200 with a marked shift to the left, but within a few days the count rose to 23,000 and then leveled off at 14,000 with a normal differential count.

A complicating factor was the presence of cirrhosis of the liver with ascites. Abdominal paracentesis was done and 5 quarts of fluid removed. The small abdominal incision necessary for this procedure remained patent and drained for weeks. The edges of the wound appeared necrotic and devitalized, though not infected. It was assumed that this was a sulfapyridine effect on the tissues, since a similar phenomenon was observed in another patient (not in this series) who after a laparotomy contracted pneumonia and was treated with sulfapyridine. The operative wound appeared devitalized and dehiscence occurred with evisceration and a subsequent fatal outcome.

16. Dr. Asa Lincoln gave permission to present this case.

Later roentgenograms (fig. 17) show considerable clearing of the lesion and shrinkage of the lung abscess. It seems likely now that he is recovering from his pulmonary infection, although the associated portal decompensation appears serious.

CASE 5.—E. M., a 46 year old white woman, gave a history of several attacks of pneumonia during the past ten years. During one of these attacks of which there is record, in 1931 she had pneumonia of the left upper lobe which cleared up spontaneously. No sputum typing was done. She subsequently complained of chronic cough and was observed in the clinic of New York Hospital in 1934. The sputum was not examined, but a roentgenogram was taken which showed increased bronchial markings. Neither this picture nor the ones taken at Bellevue Hospital are shown here because of lack of space.

She was admitted to Bellevue Hospital Nov. 30, 1939; there had been an acute onset one month before with shaking chills, pleuritic pain and the production of thick yellow sputum.

She appeared acutely ill with a fever of 104 F., consolidation of the left upper lobe and empyema necessitatis in the left axilla. There was also swelling of the left arm with a tender cord in the axilla which was believed to be a thrombophlebitic axillary vein.

The roentgenogram showed consolidation of the left upper lobe and encapsulated empyema. Thoracentesis yielded 30 cc. of thick creamy pus which showed Friedländer bacilli type A



Fig. 14 (case 3).—October 23, shrinkage of the abscess and residual infiltration.

in pure culture. The sputum was also thick and creamy and showed a predominance of gram-negative rods in the direct smear. Sputum typing showed the Friedländer bacillus type A and pneumococcus type X. The white cells numbered 22,000 with 90 per cent polymorphonuclears. The blood culture was sterile.

Thoracotomy was done December 2 with resection of a piece of the second rib and drainage of the empyema as well as the lung abscess in the left upper lobe. A bronchopleural fistula was noted.

Sulfapyridine was started on admission, the same dosage being employed as in case 3. The temperature fell to 100 F. December 1, although low grade pyrexia persisted for some time thereafter. The thrombophlebitis subsided. The patient is still in the hospital at the time of writing. Although she has shown considerable clinical improvement, she still has a draining fistula and a residual abscess in the left upper lobe.

CASE 6.¹⁷—A. G., a white man aged 50, became ill Oct. 6, 1938, with weakness, vomiting, chills, pain in the right side of the chest and cough with scanty salmon-colored sputum.

The patient was acutely ill and dyspneic on admission October 10, and there were signs of pneumonia in the right upper lobe, which was confirmed by x-rays. The temperature was not high, ranging between 100 and 102 F. Sputum typing and sputum culture at first yielded a pure growth of Friedländer bacilli, although the type was not determined. Later in the course of the disease the Friedländer organism was found in the sputum only in association with streptococci, staphylococci and other organisms. The blood culture on admission showed one colony of Friedländer bacillus. Subsequent cultures were sterile.

Sulfanilamide was employed, 1.3 Gm. being given every four hours, and this was maintained for three weeks until a total of 163.8 Gm. had been administered.

Serial roentgenograms showed unresolved consolidation of the right upper lobe with several cavities. The temperature fell by lysis, reaching normal October 16, although there was little clearing of the pneumonic lung. The white cells numbered 7,400 on admission and gradually rose to 27,400 after two weeks, with a subsequent slow fall in the count.

The patient was discharged December 14, still showing infiltration and cavities in the right upper lobe. He is observed in the clinic at intervals and complains of cough and mucoid sputum. Culture of the sputum on agar pour plates Jan. 5, 1940, yielded Friedländer bacilli type A and numerous other organisms. A roentgenogram taken Nov. 25, 1939, still showed productive changes and cavities in the involved lobe.

SUMMARY

1. Seventeen cases were observed of chronic pneumonia due to the Friedländer bacillus, a clinical condition which is rather unique in a number of ways. Generally following on the heels of the acute disease, the chronic infection lasts for months or years if a fatal issue is avoided.

2. The causative organism was isolated in pure culture in every case during life from one or more of the following sources: sputum, pleural fluid, lung fluid and blood.

3. The disease is more common in males, it occurs mainly in the fifth and sixth decades of life, and the chronic form has never been observed in childhood.

4. The onset of the illness is usually acute, the disease after a few weeks assuming the features of chronicity. The temperature is irregular, febrile periods often alternating with periods of normal temperature. In this series, the disease lasted from one month to more than three years. The mortality was 23.5 per cent.

5. Bacteremia occurred in 31 per cent of these cases as compared with an incidence of 70 per cent in the acute Friedländer pneumonia. However, in both groups of cases, the degree of blood stream invasion is mild and does not play any apparent role in the cause of death.

6. The upper lobes were the most favored sites, being involved in 82 per cent of the cases. Multiple lobe involvement was present in 30 per cent of the cases.

7. The sputum is often characteristically mucoid and bloody in the early stages, later becoming mucopurulent if suppurative changes occur. A direct smear of the sputum frequently reveals typical large encapsulated gram-negative bacilli. Mouse inoculation early in the illness generally yields a pure culture of the Friedländer organism. The bacilli may be further classified by agglutination tests and the capsule-swelling method into groups A, B, C and D. Nine of our cases were so typed, revealing seven cases of type A, one of type B and one of type C.

During the later stages of the disease, the Friedländer organism is no longer present in pure culture but is found mixed with or overgrown by secondary invaders.

8. Complications were chiefly limited to the chest and included lung abscess, bronchiectasis, pulmonary fibrosis, pleural effusion and empyema. Of these, the most frequent were lung abscess, occurring in almost 60 per cent of the cases, and empyema, which occurred in 23.5 per cent of the cases. In three of the four fatal cases there was lung abscess or empyema or both.

9. Because of the frequent occurrence of blood streaking and mucopurulent sputum and the x-ray appearance of upper lobe cavities, the condition, if the patient is seen for the first time at this stage, is commonly mis-

17. Dr. James Liebman gave permission to present this case.

diagnosed as pulmonary tuberculosis. However, a careful evaluation of the history, clinical evidence and bacteriologic study of the sputum will reveal the true nature of the disease.

10. Sulfapyridine was employed with four patients, all of whom recovered though pulmonary suppuration continued with little apparent effect. One bacteremic patient was treated with sulfanilamide and recovered, though he too contracted lung abscesses.

This is the first report in the literature dealing with the use of sulfapyridine in this disease. Despite the fact that the number of cases reported here is not large the results are sufficiently encouraging to warrant further trial of sulfapyridine in Friedländer infections of the lungs.

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LEAD ABSORPTION FROM BULLETS LODGED IN TISSUES

REPORT OF TWO CASES

WILLARD MACHLE, M.D.

CINCINNATI

Whether bullets remaining in tissues can give rise to lead poisoning has long been a subject of discussion. The great body of opinion, first expressed by Paré, holds that bullets in tissues will not cause intoxication, but there have also been proponents of the opposite point of view, and cases of plumbism from retained bullets have been reported from time to time, the earliest record being that of Bronvin¹ in 1867. Among the more than fifty publications on this subject there are reports of forty cases in which the clinical diagnosis of plumbism resulting from retained bullets has been made.²

From the Kettering Laboratory of Applied Physiology, University of Cincinnati.

1. Bronvin, de Sion: *Etiologie de la colique de plomb*, Union méd., Paris 3: 89, 1867.

2. The cases summarized in table 1 comprise the original clinical reports and are arranged in chronological order. The references not given elsewhere in the paper are as follows:

Stüve and Grossheim: Halbsseitige Lähmung nebst dem seltenen Falle einer seit 26 Jahren in der Tibia feststehenden Gewehrkugel, J. d. Chir. u. Augenh. 1: 142, 1827; cited by Küster and Lewin.³

Pluskal, F. S.: Vergiftungsfälle nach dem Anschiesen mit Bleischrot, Oesterr. med. Wchnschr., 1843, No. 19, pp. 505-507; cited by Küster and Lewin.³

Simon, Gustav: Ueber Einheilung von Gewehrkugeln in spongiosen Knochen, Vrtljschr. f. d. prakt. Heilk. 1 (pt. 1): 164, 1853; cited by Küster and Lewin.³

Vučetić, Nikolaus: Ein Bleiprojectil durch 18 Jahre und 2½ Monate festgekeilt im Knochen mit resultierender chronischer Bleivergiftung, Allg. wien. med. Ztg. 42: 221, 1897.

Nimier and Laval: Accidents d'intoxication déterminés par la rétention de projectiles en plomb, Caducée 1: 53-58, 1901.

Sabrazès: Proc. verb. Société linéenne de Bordeaux, January 1901.

Choyau, cited by Mabit, Augustin: De l'intoxication saturnine causée par le plomb introduit à doses et séjour-nant soit dans les voies digestives, des tissus, Thésis, Paris, No. 269, 1902.

Elkonin, Jacob: Ueber Bleivergiftung nach Schussverletzungen, Thésis, Königsberg, O. Kümmler, 1907.

Monatsch. d. deutsch. Jagdschutzver.; cited by Elkonin.

Ribierre and Flandin: Intoxication saturnine liée au séjour dans l'organisme de grains de plomb provenant d'un coup de feu, Bull. et mém. Soc. méd. d. hôp. de Paris 28: 813-825, 1911.

Curtillet, J., and Lombard, P.: Intoxication saturnine aiguë, mortelle, consécutive à un coup de feu par arme de chasse, Lyon chir. 7: 393-402, 1912.

Roux de Brignoles, G.: Intoxication saturnine par balle de revolver séjournant depuis vingt ans dans la paroi thoracique, Marseille méd. 50: 553-557, 1913.

Haagen, W. W.: Ueber "Bleivergiftung nach Steckschüssen," Deutsche Ztschr. f. Chir. 215: 39-47, 1929.

Klein, F.: Ueber Bleivergiftung, unter besonderer Berücksichtigung einer solchen nach einem Herzsteckschuss, Arch. f. Psychiat. 94: 128, 1931.

Neumann, Hugo: Ueber Steckschüsse mit nachfolgender Bleivergiftung, im Vergleich mit anderen Steckschüssen und Fremdkörpern, insbesondere solchen der Nase, Monatschr. f. Ohrenh. 67: 402-409 (April) 1933.

de Savitsch, Eugène: Un cas de saturnisme chronique tardif, suite de blessures de guerre (fragments de grenade) ayant simulé, successivement, une sclérose en plaques, puis une polynévrite avec ulcère peptique, J. belge de neurop. et de psychiat. 38: 32-38 (Jan.) 1938.

The entire assumption of the occurrence of plumbism from retained bullets being dependent on the occurrence of clinically identifiable lead poisoning, it would seem desirable at the outset to state the criteria on which my associates and I base such a diagnosis. They are the existence of (1) significant lead absorption, as evidenced by the presence of abnormal amounts of lead in the body fluids or tissues, (2) clinical signs and symptoms consistent with lead intoxication and (3) other laboratory observations that will support the diagnosis.

Analytic evidence of significant lead absorption, while not a sine qua non for diagnosis, affects the likelihood of the existence of intoxication so markedly that in practically all instances quantitative data on the lead content of the urine and blood are most desirable. Unfortunately, when most of the cases were recorded precise analytic methods were not available and the data on which the diagnosis of plumbism was based were not quite complete. Furthermore, as a consequence of the development of adequate procedures for lead analysis refinements in the diagnosis of plumbism have been made, and the significance of clinical symptoms and signs is now subject to somewhat more critical interpretation. For example, the presence of a lead line and the occurrence of stippling in the erythrocytes may now properly be regarded as evidences of lead absorption alone, with no certainty that intoxication exists.

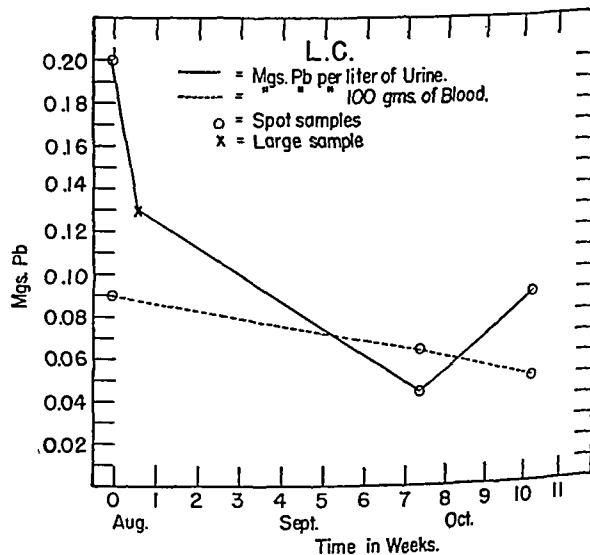


Fig. 1.—Lead excretion in case 1.

Obviously many persons have carried bullets about in their bodies for decades without acquiring plumbism. Lead bullets are not in all cases inert, however. In our cases³ determination of concentrations of lead in the urine and blood demonstrated that lead absorption of a magnitude comparable to that encountered in lead trades can result from embedded bullets. Furthermore, in one case with removal of the bullet and excision of contaminated tissues the abnormal absorption stopped and the concentrations of lead in the urine were reduced:

CASE 1.—L. C., a man aged 27 first seen in the orthopedic service at the Cincinnati General Hospital, had carried a pistol bullet in the head of the right femur for some six or seven years. In the interval the patient had not been well. Local

3. These cases were referred to us by Dr. Joseph A. Freilich, director of the orthopedic service of the Cincinnati General Hospital, who performed the operation in case 1.

symptoms were severe, and dizziness, headache and malaise had become increasingly noticeable during the past year. At the time we examined him the clinical picture did not seem sufficiently characteristic to justify a diagnosis of incipient plumbism, especially in view of co-existing marked gingival and tonsillar infection.

Samples collected on the day prior to operation contained 0.20 mg. of lead per liter of urine and 0.09 of lead per hundred

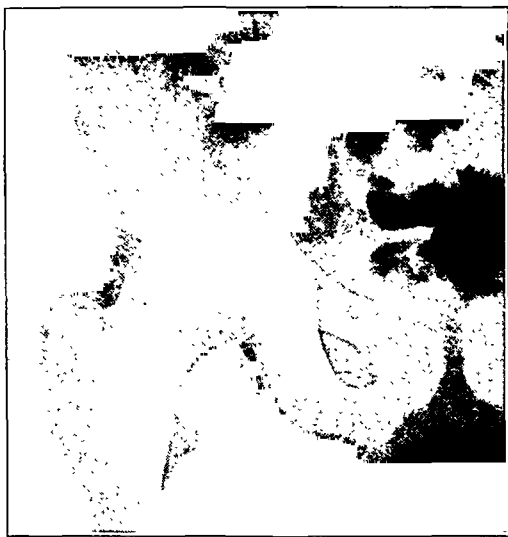


Fig. 2 (case 1).—Appearance in 1934, soon after the wound had been sustained.

grams of blood. These levels are significantly elevated and are comparable to those encountered in subjects with severe industrial exposure associated with intoxication. The bullet and contaminated tissues were removed and a vitallium cap was inserted. Subsequent samples, as shown in figure 1, revealed a steady decrease in the lead concentration in the blood



Fig. 3 (case 1).—Appearance in 1939, prior to operation.

and variable lower levels in the urine, both tending downward though not reaching normal ranges in the ten weeks following operation. In view of this reduction in the lead concentrations after removal of the bullet and the absence of any known lead exposure prior to operation, we attributed the lead absorption to the bullet. Three roentgenograms (figs. 2, 3 and 4) taken shortly after the injury, just before operation and following operation demonstrate the solution and local dissemination of

substance from the bullet, the degree to which the joint capsule and adjacent tissue were infiltrated with lead⁴ and finally the extent of removal.

CASE 2.—C. B. was wounded by a pistol bullet in the right wrist. The embedded bullet caused deformity and impaired function but there were no general symptoms indicating lead intoxication. Roentgenograms taken shortly after the wound was sustained (fig. 5) showed the clearly defined foreign body with but little shattering of the deformed projectile. The second film (fig. 6) made seven weeks later already showed some evidence of beginning solution. In the last roentgenogram (fig. 7), five years later, evidences of solution and local deposition of lead were distinct. The concentrations 0.07 mg. per hundred grams in the blood and 0.07 mg. per liter in the urine were definitely higher than those of normal persons. Since an operation has not yet been performed I cannot report on the behavior of the lead concentrations following removal of the apparent source of absorption.

The analytic and x-ray studies in these two cases leave little doubt that under certain circumstances lead in retained bullets is acted on by the tissues and made available for absorption into the general metabolism. This observation has been made earlier. Two cases of



Fig. 4 (case 1).—Appearance after operation.

Wieting and Ibrahim⁵ showed x-ray evidence of local dissemination more extensive than that seen in our cases, despite which there were no clinical symptoms or evidences of lead absorption. In the case of lead intoxication reported by Haenisch,⁶ roentgenograms with an interval of twenty-two years demonstrated a similar behavior. Furthermore, in at least fifteen of the reported cases of plumbism from bullets there was evidence of local dissemination in the bluish gray discoloration of adjacent tissues similar to that seen in our case. The presence of crystalline deposits of what seemed to be metallic particles in adjacent tissues led some observers to conclude that the local dissemination and discoloration had resulted from comminution of the projectile. Study of roentgenograms from our cases and others in which serial pictures were taken indicates that, even though fragmentation is of importance in that it increases the surface available for solution, it is not alone responsible for the local changes.

It is known that lead compounds are soluble in the tissues and body fluids; moreover it has been shown

4. A portion of the joint capsule on analysis was found to contain more than 3 per cent of lead.

5. Wieting and Ibrahim, Effendi: Bleiresorption aus steckengebliebenen Projektilen, Deutsche Ztschr. f. Chir. 104: 165, 1910.

6. Haenisch, G. F.: Ueber die Bleivergiftung bei Steckschuss, Fortschr. a. d. Geb. d. Röntgenstrahlen 53: 484-489 (March) 1936.

TABLE 1.—Abstract of Reported Cases

Author	Date	Location	Type of missile	Shattered	Interval to Onset	Spread	Other Diseases	Vomiting	Constipation	Colic	Stippling	Lead Line	Arthralgia	Wrist Drop or Central Nervous System Symptoms	Tumor or Sensory Disturbances	Lead in Urine	Anemia	Interval to Operation	Recovery	Notes
Brown ¹	1867	Hand and forearm	3 No. 5 buck shot	..	7 weeks	..	.....	..	+	+	..	+	..	..	..	..	..	9 weeks	Incomplete 3 months	Two shots removed
Ellis ²⁵	1874	Condyle, femur	Bullet	..	12 years	+	.....	+	+	+	..	+	..	Convulsions, delirium	..	..	..	.....	.....	Bullet worn
Kilster and Lewin ⁶	1892	Knee joint, femur	.....	+	18 years	+	Arthritis, fistula	..	+	+	..	±	..	—	+	..	+	.....	3 years	.....
Stille and Grossheim ²	(1827)	Marrow, right tibia	Bullet	..	20 years	+	Asthma, cerebral hemorrhage	..	+	..	..	..	..	Hemiplegia +	+	..	..	.....	Died—12 days	Cerebral hemorrhage
Pliskal ²	(1843)	Thigh and femur	20 bird shot	..	.....	..	Fistula †	..	..	+	..	..	..	.....	..	..	..	.....	.....	Weakness, cough and chest pain
Pliskal ²	(1843)	Femur	Bird shot	..	.....	..	Fistula †	..	..	+	..	..	..	.....	..	..	..	.....	.....	Febris lenta
Simon ²	(1850)	Head of humerus	Bullet	..	45 years	+	Alcoholism †	..	..	..	..	.....	..	Amentia	..	..	..	.....	.....	.....
Vuedlé ²	1897	Condyle, femur	Bullet	+	18 years	..	2 fistulas	..	+	+	..	+	..	.....	..	..	..	18 years	6 months	.....
Nimble and Laval ²	1901	Bones of hand	Bird shot 1.6 Gm.	+	4 weeks	..	2 fistulas	+	..	+	..	+	..	+	..	..	..	4 months	2 months	+
Sabrazzini ²	1901	Arm	Shot (bird?)	..	.....	..	Gas bacillus infection	..	..	..	+	..	..	.....	..	..	..	.....	.....	.....
Choyau ²	1901	Temporal bone	Bullet	..	2 years	..	Kidney stone	+	..	+	..	—	“Lead” gout	.....	..	—	+	.....	6 years	.....
Lewin ¹⁴	1907	Head and shoulder	300 bird shot	..	8 months	..	Epilepsy	..	..	..	..	..	..	Dementia and convulsions	+	..	..	.....	.....	Post-traumatic epilepsy
Elkonin ²	1907	.....	150 bird shot	..	5 years	..	.....	—	—	—	—	—	—	—	—	±	..	.....	.....	.....
Monatsch, dt. deutsch, Jagdschützvereins (cited by Elkonin ²)	(1903)	Both tibias	Bird shot	..	3 weeks	..	.....	..	..	+	..	+	+	.....	+	..	..	.....	.....	.....
Ribierre and Flaudin ²	1911	Lung and thorax	230 bird shot	..	3 months	—	Fistula †	+	+	+	..	..	..	+	+	—	3,230,000	.....	+ Incomplete	Encapsulation
Curtillet and Lombard ²	1912	Forearm	Bird shot	..	12 days	+	.....	..	..	+	+	—	..	Stupor	..	..	2,800,000	.....	Died, 10 hr. postoperatively 1 year	Gangrene muscle
Roux and Belinoles ²	1913	Chest wall	Pistol bullet	..	20 years	..	Aortic disease	—	+	..	..	—	..	.....	..	..	..	.....	.....	.....
Nou ¹⁸	1915	Vertebrae	Shrapnel	..	3 months	..	.....	..	..	+	..	—	+	.....	..	+	..	.....	.....	.....
Nelser ²¹	1917	Chest	Shrapnel	..	6 weeks	..	.....	..	..	..	—	—	+	“Lead” neurasthenia	..	±	—	.....	.....	.....
Nelser ²¹	1917	Thigh and calf	7 buck shot	..	25 years	..	Arthritis	..	..	..	—	..	“Lead” gout	.....	..	..	..	.....	.....	.....
Schlesinger ²²	1918	Face	.....	..	.....	..	.....	..	..	..	..	..	..	.....	+	—	..	.....	.....	Lead in spinal fluid
Schlesinger ²²	1918	.....	Pistol bullet	..	25 years	..	.....	—	—	—	—	—	+	—	—	+	..	.....	.....	Lead in spinal fluid, 6 mg. per liter
Curschmann ²⁴	1918	Head of femur	Bullet	+	1 year	+	Pyelitis, duodenal ulcer, nephritis	..	+	+	+	+	..	Deltoids weak	..	0.2 Gm.?	3,200,000	1 year	Died 3 days postoperatively	Encephalopathy?
Curschmann ²⁴	1920	Lung	Bullet	..	.....	..	Gastric ulcer	..	+	..	..	..	..	.....	..	..	+	.....	.....	.....
Hubs ²⁰	1927	Iscium	Rifle ball	+	41 years	..	Fistula, arthritis	..	..	..	..	..	+	.....	..	..	..	22 years	?	.....
Habs ²⁰	1927	Head of femur	Rifle ball	—	10-12 years	+	Ankylosis † capsule	..	..	+	600/M	+	—	+	—	+	Hb. 60%	12 years	.....	.....
Haugen ²	1929	Left knee	Bullet	+	22 years	..	.. †	..	..	..	±	±	..	Ataxia + memory loss	+	—	+	—	+	Dementia, ataxia, Wassermann negative 0.15 blood
Klein ²	1931	Myocardium	Shrapnel	..	4-10 years	..	Neurasthenia	..	..	..	4,000	—	+	Vertigo and neurosis	+	..	Ith. 58%	.....	.....	.....

that the solubility of metallic lead is greater in fats and biologic fluids than in water, particularly in the presence of higher tensions of carbon dioxide.⁷ This indicates how metallic lead in the tissues may serve as a source of lead absorption; it does not, however, elucidate the mechanism of the local redeposition. This may result from chemical differences between healing wounds and adjacent uninjured tissues. That mechanical factors such as abrasion may accelerate solution of the projectile is illustrated in the case of Kohlschütter,⁸ in which the shrapnel bullet was embedded in the lateral fossa of the articular surface of the tibia exposed to joint action. In five years there was considerable loss of material from the bullet and extensive deposits about the knee joint, the popliteal bursa being filled with a frothy grumous gray mass and the joint capsule and cartilage colored a bright blue. In our first case the bullet was exposed on the head of the femur and showed wear from action of the joint.

A study of the reported cases was undertaken in an attempt to estimate the importance of any other factors

TABLE 2.—Summary of Forty Reported Cases

Interval to onset.....	13 days to 48 years; less than 1 year, 12; 1 to 10 years, 5; 10 or more years, 17 (6*)		
Location of missile.....	Bone and joint, 24; soft tissue 13 (3*); bathed with synovia, 8		
Type of missile.....	Bullet 19, shot 11, shrapnel 7 (3*)		
	Present	Absent	No Information
Dissemination.....	15	1	24
Associated diseases.....	26	1	13
Vomiting, constipation or colic.....	26	2	12
Arthralgia, paralysis or central nervous system symptoms.....	23	1	11
Lead line.....	15	8	17
Stippling.....	14	5	21
Anemia.....	12	4	24
Lead in urine.....	Significant concentration 2, present (qualitative) 9, absent 3 (26*)		
Recovery.....	Complete 11, partial 2, died 5 (22*)		

* Number of cases in which there was no information.

which might influence absorption. Details of the cases are given in table 1 and a summary of the significant observations in table 2.

As far as I have been able to determine, these forty cases comprise all the published cases of lead poisoning from bullets lodged in tissues. One is impressed first of all with the paucity of cases as compared to the frequency both of gunshot wounds and of bullets that have been permitted to remain in the body. I took as my criterion for inclusion in this study the fact that a clinical diagnosis of lead intoxication had been made by the respective author, without regard to the probable validity of the diagnosis. Exceptions are the six cases reported by Lewin in 1892, when Küster and Lewin⁹ first interested themselves in this problem. These had been reported by other authors; Lewin averred that lead intoxication had been responsible for the symptoms in each case but had been overlooked.

It is apparent that plumbism was not associated with any particular type of missile. Under the heading

7. Clague, T. M., and Watson, A. J.: Experiments on the Solubility of Plain Lead and Antimonial Lead (with Reference to Retention of Shrapnel in the Body). *Brit. M. J.* 2: 757 (Dec. 8) 1917. Oliva, Carlo: Studio sperimentale della intossicazione da piombo consecutiva a ferite d'arma da fuoco da caccia. *Chin. chir.* 21: 1981-2002, 1913.

8. Kohlschütter, Reinhard: Die Gefahr der Bleivergiftung durch steckengebliebene Geschosse. *Med. Klin.* 15: 1063, 1919.

9. Küster, E., and Lewin, Louis: Ein Fall von Bleivergiftung durch eine im Knochen steckende Kugel. *Arch. f. klin. Chir.* 43: 221, 1892.

Author	Year	Location	Missile	Time	Wound	Lead in urine	Lead in tissues	Other lead exposure?
Taitavall ²³	1941	Groin	Bullet	9 years	+	+	0.22	0.05 blood
Weyrauch ²⁴	1932	Pectoral muscle	Shrapnel	10+ years	..	..	0.11	..
Neumann ²	1933	Leg	Bullet	7 months	+	+	..	0.35 blood
Levke ²⁴	1931	Head of humerus	Shrapnel	10 years	+	+	0.18	..
Londres ¹¹	1934	Tibia ?	Pistol .38	2 months	+	+	..	Bullet worn
Mastibovsky ¹²	1935	Bones; foot and shoulder	Shot	3 months	+	+	..	..
Hansen ⁶	1936	Spine	Bullet	22 years	+	+	..	Progressed
Rutshnuser ¹³	1936	Brain	Bullet 2.5 Gm.	48 years	+	+	..	Diagnosed as lead in tissues
Fischer ²⁵	1937	Sacral vertebra	Rifle bullet	12 years	+	+	..	..
Fischer ²⁵	1937	Femur	..	17 years	+	+	..	..
Fischer ²⁵	1937	Lumbar vertebrae	Shrapnel	5 years	+	+	..	..
de Savitsch ²	1938	Chest, legs and hand	120 gr. nade	Less than 1 month	+	+	..	..

* Bathed with synovial fluids. † Other diseases not specified.

"bullet" I have included rifle and pistol bullets as well as musket balls. Shot—"bird" and "buck"—accounted for a fairly high proportion of the cases, and this is particularly noteworthy when one considers the large number of shrapnel and rifle bullet wounds sustained in the war of 1914-1918. Evidence from *in vitro*

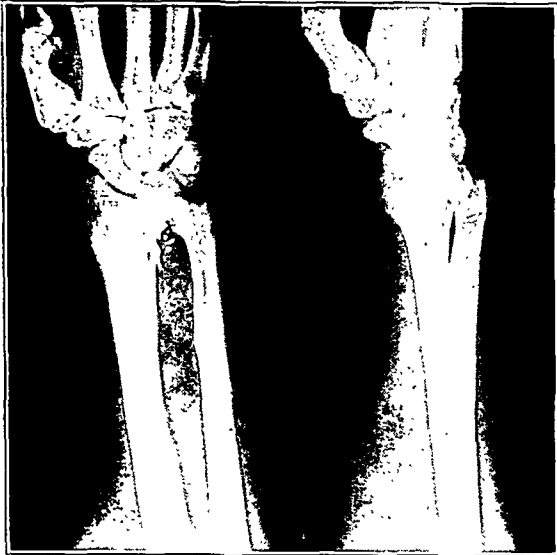


Fig. 5 (case 2).—Appearance in 1934, shortly after the wound had been sustained.

experiments¹⁰ has indicated that solution of lead from jacketed bullets occurs and may exceed in degree that from uncovered lead, but there is no clinical evidence to bear this out.

The interval between lodgment of the bullet and onset of symptoms diagnosed as due to plumbism was widely variable (from twelve days to forty-eight years). Of the thirteen cases in which the symptoms developed in less than one year, only two would be considered cases of plumbism at the present time. In the one case¹¹ the onset occurred two months after the wound was received. The bullet was in the head of the tibia, however, was exposed on the articular surface and was found to be greatly worn by action of the knee joint. In the second case,¹² in which intoxication followed three months after shot wounds of the bones of the shoulder and foot were sustained, local dissemination of the shot was noted.

More than half the missiles were in the bones or joints, and in eight of these cases it was specifically stated by the author that the missile was bathed with synovial fluid. In all but two of the ten cases of probable intoxication the bullets were lodged in bones or joints.

Dissemination, which was noted in fifteen cases, was in some instances associated with shattering of the projectile; in others it was due solely to solution and redeposition of the lead.

More than half the patients had some associated disease at times related to the wound. In nine cases suppuration and fistulas were present at the site of the wound and evidences of arthritis were noted when the wounds were near joints (five cases). Other

diseases were gas bacillus infection, coronary thrombosis, diabetes, duodenal ulcer in two, neurasthenia, and post-traumatic epilepsy. In instances in which laboratory evidence of significant lead absorption is wanting, it is often impossible to be entirely certain that the symptoms were due to plumbism, particularly when the clinical manifestations on which the diagnosis of plumbism was made were those frequently resulting from the associated disease. For example, in one report¹³ the patient was said to have intermittent claudication, arteriosclerosis, chronic nephritis, diabetes and coronary infarction and while under study was operated on for gangrene of the foot. This patient had had a 2.5 Gm. bullet in his brain for forty-eight years. No characteristic symptoms of lead intoxication were present, the diagnosis being based on the presence of lead in the tissues obtained at necropsy. These amounts, particularly in the brain, were somewhat larger than those normally encountered in this country, but their presence without clinical symptoms of plumbism merely indicates that the lead absorption of the patient has been greater than normal.

Vomiting, constipation or colic were present in twenty-seven cases. Three patients had all three symptoms, eight had constipation and colic alone. In seven colic was the only symptom of the digestive tract noted.

Neuromuscular symptoms or symptoms of the central nervous system were frequently present; six patients had antibrachial paralysis, and in one case there was an associated hemiplegia. Delirium and convulsions were present in two cases and were attributed to lead encephalopathy. One of these patients had epilepsy; however, while in the other case the only signs of lead



Fig. 6 (case 2).—Appearance seven weeks later than the view shown in figure 5.

intoxication were lead line and digestive symptoms. Stupor or amentia was present in three cases and neurasthenic or psychasthenic symptoms were present in three. In four cases arthralgia, tremor and paresthesia were the only disturbances noted.

The lead line, present in sixteen cases, may be taken as evidence of lead absorption, and the same is true

10. K. J. ... und Fremdkörperbestimmung. In: K. J. ... Bruns Kriegschirurgische Hefte der Heft. 88, 1916, vol. 5, pt. XX, p. 21.
11. Londres, Genival: Intoxication saturnine par une balle de plomb, Presse méd., 42: 465-468 (March 21) 1934.
12. Metibovskiy, I. A.: Case of Lead Poisoning After Gunshot Wound, Sovet. khir., 1935, No. 12, pp. 85-88.

13. Rutishauser, E.: Bleigangrän und Encephalopathie, Virchows Arch. f. path. Anat. 297: 119-140, 1936.

for stippling, present in fifteen cases. Both stippling and anemia were of lower incidence than would be anticipated in cases of frank plumbism such as are seen in industry.

Of particular interest would have been the progress following removal of the bullet, which was done in most cases. Unfortunately, in more than half the cases death occurred or notes on the postoperative course were omitted.

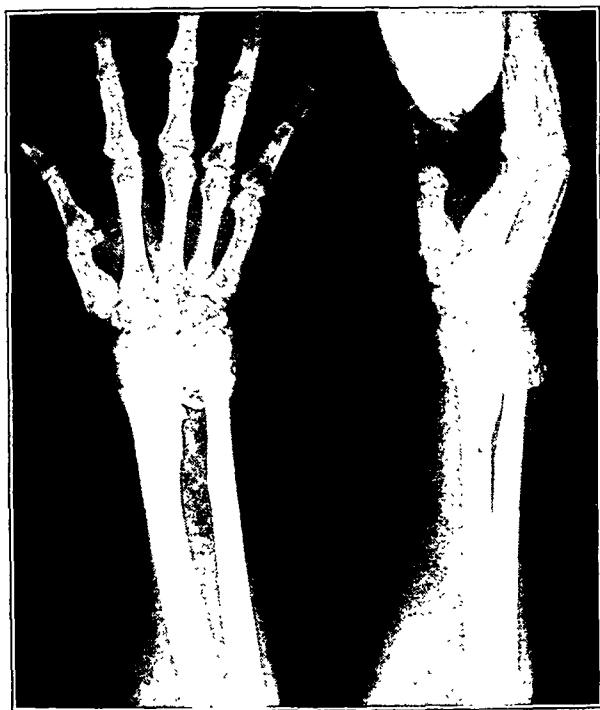


Fig. 7 (case 2).—Appearance in 1939.

COMMENT

Not more than eight or ten of these cases at most will certainly satisfy present day requirements for the diagnosis of lead poisoning. In most instances the symptoms would be attributed to other causes. With the present means for determining the magnitude of lead absorption, uncertainty need no longer exist. If significant amounts of lead are being absorbed from a projectile in the tissues, the fact may be established readily and the likelihood of intoxication estimated.

The question of the advisability of removing bullets wherever possible has been raised by many authors. Bronvin,¹ Lewin¹⁴ and others held that intoxication from bullets occurred with greater frequency than was suspected, while others, as Bonhoff,¹⁵ Hofbauer,¹⁶ Dennig¹⁷ and Neu¹⁸ and clinical surgeons have denied this emphatically. A few, particularly Braatz¹⁹

and Habs,²⁰ are of the opinion that plumbism from bullets may occur rarely but that this does not constitute an adequate indication for removal of the projectile in all cases. Much of the confusion is due to differences in the interpretation of analytic results and, to a greater extent, to differences in opinion as to what constitutes the clinical entity known as plumbism. For example, Neisser,²¹ Lewin, Schlesinger²² and others considered a positive qualitative test for lead in the urine, blood or spinal fluid as evidence of intoxication, while Hofbauer, Dennig, Neu and Lipp²³ considered such a finding devoid of diagnostic significance in the absence of clinical symptoms of intoxication. The accepted view at present is that, since lead is normally present in small amounts in the body fluids, quantitative data are necessary and results are significant only when normal levels are exceeded.

Opinions on the clinical diagnostic criteria are as diverse as those regarding the laboratory data. One extreme of opinion expressed by Haenisch⁶ is that instances of "fatal plumbism can occur in which the known usual signs of the disease are lacking," and Neisser considered the presence of neurasthenic symptoms to be adequate evidence of lead intoxication. On the other hand, after critical examination of cases reported up to 1922 Bonhoff¹⁵ concluded that the symptoms were in the main general and could be attributed to suppuration or other disease; in any event the cases had been too poorly studied to exclude other avenues of lead absorption or the effects of improvement in the diet and regimen in the hospital. Habs²⁰ studied the thirty-six cases reported up to 1927 and considered six as cases of proved plumbism, the remainder doubtful.

My opinion from a study of the forty cases reported up to this time conforms with that of Habs. I have found eight or ten cases of probable lead intoxication. Of these only three²⁴ satisfy all the criteria in that quantitative analytic data were obtained on body fluids; in seven other cases²⁵ the clinical evidence makes the diagnosis seem probable.

CONCLUSIONS

There are forty reported cases of lead poisoning from bullets lodged in the tissues. Only three fulfil all modern criteria and in seven others the diagnosis seems probable. A further thirteen showed signs of lead absorption.

Poisoning from this source is a rarity, but lead absorption can occur from bullets lodged in the tissues, particularly in bones at the joints, as in the two cases reported in this paper. The possibility of delayed intoxication should have some weight in the decision as to the removal of bullets.

Eden Avenue.

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17. Dennig, Adolf: Ueber das chemische Verhalten der Bleigeschosse im menschlichen Körper, Med. Cor.-Bl. d. württemb. ärztl. Landesver. 85: 33, 1915.
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THE NEWBORN NURSERY FROM THE POINT OF VIEW OF THE PEDIATRICIAN

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I have selected this subject for joint discussion in this obstetric-pediatric symposium because it offers controversial material for our consideration which carries with it responsibilities of interest to the obstetrician, the pediatrician and the man in general practice. A discussion such as this would not be inclusive unless one considers the newborn nursery as found in the large general hospital with both open and closed staffs, the special lying-in hospital, and the local hospitals widely scattered in the smaller cities throughout the various states.

Only a few of our larger cities can support a special maternity hospital and therefore it becomes necessary for the general hospital to establish special departments for obstetric cases which must provide the best care possible for the mothers and their babies. Many of our hospitals were built in the past, when hospital deliveries represented 25 or 30 per cent of a community's total deliveries, and were not equipped to meet the exigencies of the present day, when as many as 85 per cent of deliveries occur in hospitals. In Chicago during 1939, of 48,909 live births 84.8 per cent of all deliveries took place in sixty-nine hospitals; 14.1 per cent in homes were delivered by doctors, and approximately 1 per cent by midwives. In 1939, 4,670 live babies were born in Cook County Hospital.

In many instances the modernizing of delivery rooms has preceded the improvement of the newborn nursery.

In full appreciation of the fact that a high percentage of all deliveries in the United States are conducted by physicians in general practice, responsibility for the lowering of infant mortality and morbidity nevertheless rests to a large extent on the provisions for the safe care of the mother and child which in their wisdom have been adopted through mutual agreement by departments of health and the medical members of hospital staffs more directly interested in obstetrics and the newborn infant.

The reduction of maternal and infant death rates throughout the United States, and we cannot separate consideration of results attained for both the mother and the child, in the past ten years stands out as a striking answer and refutation of the popular uncensored articles appearing in the lay journals. In Illinois, the state with whose activities dealing with maternal and child welfare I am best acquainted, as an example, there has been a reduction in maternal deaths from 5.23 per thousand births in 1930 to 4.55 in 1935 and 2.88 in 1939, and in Chicago from 4.95 per thousand births in 1930 to 3.46 in 1935 and 2.5 in 1939. These figures speak for themselves.

Even more striking has been the lowering of infant mortality in Illinois in the first month and first year of life, from 56 per thousand live births in the first year of life in 1930 to 45.9 in 1935 and 37.88 in 1939, and in Chicago from 53.4 per thousand live births in 1930 to 40.1 in 1935, 33.7 in 1938 and 31.3 in 1939, or a drop of 41.38 per cent in the last ten years. These figures are representative of what is being noted

throughout the United States. We are all agreed that they do not represent the ultimate results to be attained, but they speak well nevertheless for the constructive efforts of those who have been most instrumental in making this possible.

As far as the infant is concerned, the least progress has been made in the number of deaths within the first day, the first week and the first month of life. Many of our states and cities are now concentrating more definitely on the care of the newborn infant in its first days, and especially on the care of the prematurely born infant. It is unfortunate that, in the quoting of statistics, more definite stress has not been placed on the different races of our population, with special consideration of the urban and rural facilities available.

The accomplishment of the best attainable results will be dependent on definite vesting of authority for the conduct of the maternity division and the newborn nursery in reliable and deeply interested medical staff members under whose authority and direction the nursing staff functions. For the safeguarding of the best interests of the mother, her child, the hospital and the prestige of the medical profession, a willing and able consulting staff must also be available.

In the institutions with which I have been connected, confusion and the working at cross purposes have largely been dependent on the absence of regular and constructive conferences between the obstetricians responsible for the maternity wards and the pediatricians or the practitioners in whose care one may find the infants.

Among the provisions of exceptional importance to the newborn are (1) the establishment of regulations covering the conduct of the puerperium as related more especially to the care of the mother's breasts, (2) who shall assume the responsibility of establishing and promoting breast feeding in the early days of the puerperium, and (3) the placing of definite responsibility for the general conduct of the nursery.

At a recent meeting of the American Academy of Pediatrics, one of the discussers remarked that in his community the breast-fed infant was a rarity—this in contradistinction to the results achieved in our Cook County Hospital, where approximately 85 per cent of the mothers are discharged with their babies feeding at the breast.

Few who have had experience in the management of infants will deny the importance of breast feeding, but many who acknowledge its importance do little to encourage it. I am certain we all agreed that many more children should be breast fed than are at the present time. There are many possible causes of failure on the part of the mother to meet her infant's needs, but faulty management is undoubtedly the most common.

It has been my experience that the obstetrician often gives excellent general care to the mother during the latter months of her pregnancy but pays little or no attention to her breasts, especially in the matter of preparing the nipples for the trauma of lactation. Many obstetricians believe that excessive antepartum manipulation of the nipple is of only moderate benefit, and I think that we will all agree that in the nipple with congenitally short ducts the result is usually disappointing. I do not overlook the fact that some breasts are not fitted by nature to function adequately, because of insufficient glandular element.

The first days are the danger period to successful breast feeding. First, the obstetrician provides for the mother his most solicitous attention; he has practiced his best obstetrics and has presented her with a normal, uninjured infant. His fears, if any, are centered on the possibility of postpartum complications in the mother. Not the least of these is his desire to avoid trauma to the nipples, with their further danger of secondary breast infection.

As the obstetrician is responsible for the relief of the original hyperemia, guarding against cracked or bleeding nipples and their general care, instruction for their care will naturally be assumed by him. If the mother develops mastitis and breast surgery becomes necessary, the responsibility for such a condition is his. Consequently, I believe that the establishment and maintenance of breast nursing in the early days should be assumed primarily by the obstetrician. If the obstetrician is seriously interested in breast feeding, I believe there should be no conflict of opinion.

I wish, however, to emphasize that if the pediatric representatives do not have access to the mother's breasts so that they can judge their ability to respond to the baby's efforts or those of manual expression, the responsibility of the pediatric service to the newborn is not fulfilled.

What then are the pediatrician's responsibilities? I believe that, where he has been made responsible for the nursery care of the newborn, the conduct of the nursery in its entirety should be his responsibility. The supervising nurse of the nursery should be responsible to the pediatrician and should in turn be under the jurisdiction of the chief nurse in the obstetric department, the latter acting as a liaison officer between the obstetrician and the pediatrician. The nurse in charge of the nursery therefore should be pediatric minded and should of course have had obstetric experience.

It is unfortunate that in some of our institutions, notwithstanding the fact that a visiting pediatrician is responsible in name, he does not assume his full duties. I take it for granted that it is understood that I have been talking largely of service cases. It must of course be realized that, as far as private cases are concerned, the dividing of responsibility for the care of the infant is one of mutual consent.

Most of the responsibility for the service must be left in the hands of the obstetric resident or senior intern, if there is no resident. Joint daily rounds should be made in the nursery by the obstetric and pediatric residents. Causes for weight loss are to be sought for in both mother and infant. On the part of the mother delayed secretion, sore or fissured nipples, depressed nipples, congestion of the breasts and actual insufficiency of secretion due to quality of the breasts must all receive consideration. As far as the infant is concerned, all factors which might be causes for poor nursing must be sought for, more especially congenital anomalies, immaturity and birth hemorrhage.

At stated intervals, rounds of the lying-in division and nursery should be made by the obstetricians and pediatricians so that there can be a definite understanding covering the views of both departments concerning the care of the mother's breasts and the technic established in the nursery.

The chief obstetric nurse, the nurse in charge of the newborn nursery and the house staff should be included in these ward rounds. Much misunderstanding can also be avoided in institutions where the man

in general practice does his own obstetric work and assumes the responsibility for the care of the infant, through such conferences. It must be remembered that the bulk of deliveries throughout the country are under the care of men in general practice.

FEEDING REGULATIONS

Now let us look back a century and a half and note the fine wisdom of William Cadogan (1711-1797). In "An Essay upon Nursing and Management of Children from Birth to Three Years," published in 1748, he states:

I am confident from experience that with a Child kept without food of any kind until it was hungry, which it is impossible it should be just after birth, and then applied to the Mother's breasts, it would suck with strength enough, after a few repeated trials, to make the milk flow gradually in due proportion to the Child's unexercised faculty of swallowing and the call of its stomach.

Four times in four-and-twenty hours will be often enough to give it suck; letting it have as much as it will take out of both breasts at each time. The Mother's milk seldom comes until the third day. The Child is born full of blood, its appetites not awake, nor its senses opened; and requires some intermediate time of abstinence and rest to compose and recover from the struggle of the birth and the change of circulation.

Dry-nursing (artificial feeding) I look upon to be the most unnatural and dangerous method of all. To breed a Child in this artificial manner requires more knowledge of Nature and the animal economy than the best Nurse was ever mistress of; the skill of a good Physician would be necessary to manage it rightly.

At the Michael Reese Hospital the following is the routine practice: Normal full-term infants are placed at the breast six hours after delivery, and then for not more than five minutes on either breast, and thereafter at four hour intervals five times during the twenty-four hours. Water without carbohydrate addition is fed to the infant six times in twenty-four hours, in amounts of 1 ounce at first and up to 2 or 3 ounces later. Infants are kept under close observation for evidence of inanition. If at the end of the fourth day the breasts are still not showing evidence of secreting an adequate amount of milk, a milk mixture is started as a complement. Usually both breasts are offered at a nursing. In our experience the average infant leaving the hospital at the tenth day after birth has reached a weight within 100 to 150 Gm. or less of its birth weight.

Since most cracked nipples develop during the first four days, this is the important period for prophylaxis. Factors which should be recognized as helpful aids to breast feeding are:

The application of the breast pump or hand expression for aid in developing the retracted nipple.

The placing of the infant at the breast for not more than five minute periods during the first three or four days, or preferably at both breasts for even shorter periods.

Simple depression of the lower jaw of the infant should be practiced at the conclusion of feeding to prevent trauma as the infant is being removed from the breast.

In the presence of cracked nipples the infant may well be taken off the breast temporarily, and hand expression or breast pump should be used during that time to promote secretion.

At Cook County Hospital, twenty-four hours after birth the infant is fed an ounce or 1½ ounces of breast milk obtained from wetnurses, the objective

being to implant *Bacillus bifidus* in the intestinal tract. This organism keeps the p_H very low, thereby retarding the growth of the colon group of organisms. The infant is not placed to the breast until after this first feeding of breast milk. With this procedure the early stools of the infant are of the so-called breast-fed type. There have been no severe diarrheas in this newborn nursery in the last three years.

ADVANTAGES OF JOINT OBSTETRIC AND PEDIATRIC ARRANGEMENT

The advantages of a joint obstetric and pediatric arrangement are:

1. The physician in charge of the mother will have evaluated her possibilities for breast feeding and by advice often avoid the anxiety of the mother as to her ability to carry on when at home, when she so often learns for the first time that her crying baby is simply carrying on the same performances that he was accustomed to in the hospital nursery.

2. On discharge from the hospital there will be avoided abrupt changes in routine in the care of the infant, as is so often the case when the pediatrician does not enter the picture until the infant is returned to its home.

Every mother should be taught manual expression while still in the hospital. The nursing division has not performed its obligation to the mother and infant unless the mother has been taught manual expression, if for no other purpose than that breast bottle feeding can be provided in case of emergency. The electric pump has a large and successful place in the hospital nursery; however, it carries the danger that hand expression may not be taught the individual mother. The infant is, of course, by all odds the best breast pump.

PREPARATION FOR DISCHARGE

By the tenth or twelfth day the average mother is discharged from the hospital and assumes the responsibility for the care of her infant in the home. With what preparation does the average mother in moderate circumstances who cannot afford a trained nurse or nurse maid assume her home care of the infant?

The individual instruction in some well organized hospitals is good; in most of them it is indifferent. She may be given some printed directions or a board of health God's blessing and the good wishes of the obstetric department. When, in at the most four hours from the time she has left the institution, the infant starts the well rehearsed performance which he has so well practiced and which has achieved the desired results but with which the mother was so little acquainted, there starts the chain of circumstances which I am sure I do not have to recount for your information, for they are only too well known to you, your own household and the telephone company, the results being a decrease in or even a drying up of the breast milk supply.

CONCLUSION

I would urge that staff conferences open to all local physicians should be held at stated times in all hospitals. At such meetings all phases of maternity and newborn care should be discussed, and their value becomes increasingly productive when individual records and cases are discussed.

It has been the experience of those interested in furnishing so-called refresher courses in obstetrics and pediatrics that the progressive physicians are in regular attendance, while those who might profit most are

conspicuous by their absence. Sooner or later all must avail themselves of hospital service for their patients, and it is in the community hospital that they can best be contacted.

In every city or town "Every hospital should be a teaching center."

104 South Michigan Avenue.

Clinical Notes, Suggestions and New Instruments

NERVE ROOT INFILTRATION IN MYELOGENOUS LEUKEMIA

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Involvement of the central nervous system in the course of acute or chronic myelogenous leukemia is not unknown. As emphasized by Critchley and Greenfield¹ in their discussion of cord symptoms in leukemia and chloroma, the pathologic manifestations in such cases may be of several kinds. Localized collections or "tumor formations" of the abnormal white blood cells in the meninges are most common, according to these authors. The cases reported in their article of four males aged 19 years or younger were featured by the presence of such leukemic or chloroma masses in the epidural or subarachnoid spaces. In addition, however, a special finding in three of the cases was invasion of the spinal and cranial nerve roots by the myeloid elements, which in these cases apparently accounted, at least in part, for the radicular pains and other disturbances (including peripheral facial and palatal palsies, as well as unilateral deafness) from which the patients suffered. Root infiltration was also prominent in the report of Cornil and his associates,² but in that instance there were also an epidural tumor, hemorrhages and leukemic invasions in the parenchyma.

In the case which forms the subject of the presentation which follows, it is felt that the symptoms and physical manifestations are most readily explicable on the single basis of injury to cranial and spinal nerves secondary to the entrance of myeloblasts and myelocytes into the nerve roots.

Examples in the literature of other cerebrospinal complications referable to the blood dyscrasias, such as myelomalacia subsequent to thrombosis or compression or widespread extensions of the abnormal cells into gray and white matter,³ will not be referred to in detail, since they are not pertinent to the present discussion.

CLINICAL HISTORY

P. M., a white man aged 39, a janitor, admitted to the Grace Hospital, Jan. 22, 1940, complained of inability to walk for the previous two and one-half weeks.

The onset of the present illness apparently occurred about four or five months before hospitalization. At that time vision in the left eye became blurred; the extraction of several teeth did not improve this difficulty. One month later the sight in the right eye began to fail and the patient rapidly became blind on that side, visual acuity in the left eye recovering meanwhile. He also noted that the right side of his face was somewhat asymmetrical. During an admission to another hospital both tonsils were removed, and severe bleeding persisted from the tonsillar beds postoperatively. The patient then realized that his legs were becoming weak; he felt tired and listless and noticed loss of weight.

Dr. C. J. Bartlett gave the authors permission to use the gross autopsy report.

From the Grace Hospital and Department of Pathology, Yale University School of Medicine.

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For the two and one-half weeks before coming to the Grace Hospital, loss of strength in the lower extremities had been so extreme that he had been confined to bed. The right arm by this time was not as strong as formerly, there was partial deafness in both ears and the right facial weakness had become more marked.

The past and family histories were noncontributory.

On admission the temperature was 103 F. (rectal), the pulse 110 beats per minute, the respiratory rate 30 per minute and the blood pressure, 146 mm. of mercury systolic and 100 diastolic. The patient was well developed and appeared well nourished but chronically ill. Both ear drums were gray. The heart was not enlarged, there were no cardiac murmurs and the lungs were not unusual on percussion and auscultation. The edge of the liver was palpable two or three fingerbreadths below the right costal margin. A few slightly enlarged lymph nodes could be felt in each inguinal region. There was marked tenderness to percussion in the right costovertebral angle.



Fig. 1.—Myeloblasts and myelocytes in the cerebral meninges. Arrow indicates young myeloid cell with hyperchromatic nucleus. Giemsa stain; $\times 250$.

The patient was well oriented and the sensorium seemed to be intact. The sense of smell was present bilaterally. He was completely blind in the right eye, the fundus of which was obscured by haziness of the media. The nasal margin of the left optic disk was blurred and the retinal vessels were sclerosed. The right pupil was fixed to light, while the left responded sluggishly. There was no apparent defect in the left visual field. Slight nystagmus was present on right lateral gaze. The corneal reflex on the right was absent but that on the left was not. There was obvious right facial paralysis of the peripheral type. The right ear was completely deaf, and hearing in the left was impaired. The gag reflex was absent.

Both arms were weak, but not more so than could be accounted for on the basis of the patient's general condition. Biceps and triceps reflexes were in order. The abdominal cutaneous reflexes were absent on the right and sluggish on the left. Cremasteric responses could not be obtained on either side. There was a flaccid paraplegia of the lower extremities, and tendon jerks could not be elicited in the legs. The Babinski sign was absent bilaterally.

Vibratory sensation was impaired in each lower limb.

During the next two days the stools were noted to be tar colored, and tests revealed that they contained blood. Abdominal distention had appeared as well. A lumbar puncture, performed on the third hospital day, disclosed an initial pressure of 260 mm. of water, which fell to 160 mm. when 10 cc. of slightly

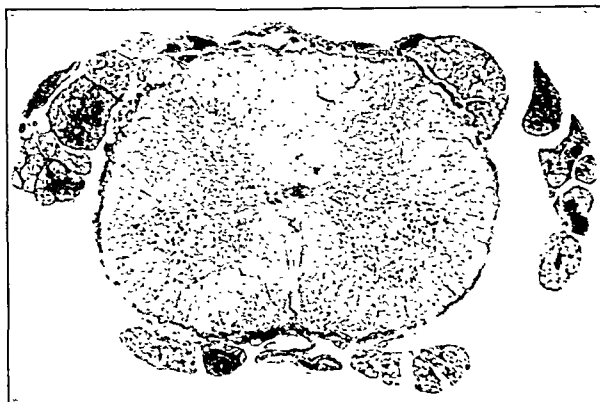


Fig. 2.—Section through lumbar spinal cord. Note heavy infiltration of roots of cauda equina. Nissl stain; reduced from a photomicrograph with a magnification of 10 diameters.

turbid fluid was removed. Examination of the specimen revealed the presence of 1,015 large mononuclear cells, 5 erythrocytes and 5 polymorphonuclear leukocytes in a cubic millimeter of the fluid. The results of a blood count on admission were (per cubic millimeter) red blood cells 4,100,000, hemoglobin 65 per cent (Tallqvist), white blood cells 12,000, differential count: polymorphonuclear leukocytes (segmented forms) 52 per cent, nonsegmented neutrophils 6 per cent, large lymphocytes 18 per cent, small lymphocytes 21 per cent, monocytes 0, eosinophils 3 per cent and basophils 0.

The spleen became palpable on the fourth hospital day and the liver seemed enlarged, as compared with the previous examination. Ascites was also detected. A papulopustular rash on the upper arms and trunk appeared the next day (fifth), the eyelids had become edematous and the right conjunctival sac was injected. The initial spinal fluid pressure on that day was 220 mm. of water; a web formed immediately on the surface of the fluid withdrawn and microscopic study of the specimen

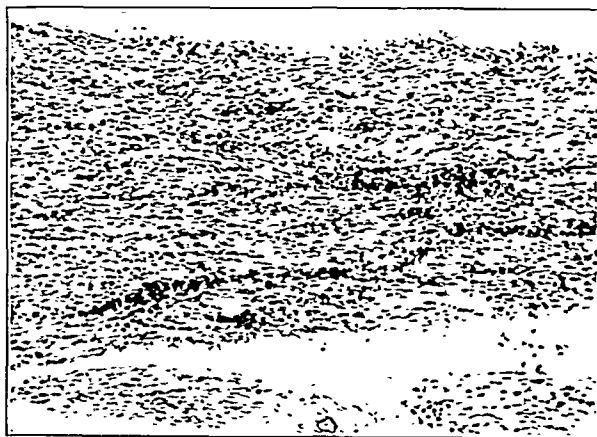


Fig. 3.—Longitudinal section of the left acoustic nerve. Leukemic cells clumped between and among adjacent myelinated axis cylinders. Nissl stain; reduced from a photomicrograph with a magnification of 125 diameters.

revealed numerous small lymphocytes, many large mononuclears and several multinucleated giant cells.

The opinion of one of us (B. S. B.) at this time was that the patient was suffering either from a chronic infectious process of the central nervous system (such as tuberculosis or torulosis) or from myelogenous leukemia with cerebrospinal involvement.

A third spinal fluid examination was then made (sixth hospital day). The pressure was still elevated (230 mm. of water), and 2,560 large mononuclear cells, 3 small mononuclears and 70 erythrocytes as well as a few multinucleated giant cells were found in a cubic millimeter of the turbid fluid.

One week after admission an icteric tint to the skin and scleras was noted. The patient was incontinent of urine. Three days later the neck was slightly stiff, and the next day (tenth hospital day) he died. The temperature, which had fallen to around 101 F. shortly after admission, rose to 103 F. (rectal) just before death.

SUMMARY OF LABORATORY OBSERVATIONS

The red blood cell count ranged around 4 million per cubic millimeter with the hemoglobin content near 65 per cent (Tallqvist) during most of the patient's stay. The number of white blood cells varied from 12,000 to 14,000 per cubic millimeter. Numerous differential counts revealed from 40 to 60 per cent segmented polymorphonuclear leukocytes, from 10 to 20 per cent unsegmented neutrophils, from 9 to 18 per cent "large lymphocytes" and from 15 to 20 per cent "small lymphocytes." A few normoblasts were seen in smears of the blood taken in the last three days.

A positive test for albumin (1 plus) was recorded in all urinalysis reports. Rare white and red blood cells were seen in the urinary sediment on all occasions, with an occasional cast being discovered shortly before death. Specimens taken on the third and ninth hospital days were positive for bile.

The blood and spinal fluid Wassermann and Kahn reactions were negative.

NECROPSY

Postmortem examination was performed four hours after death. Petechial hemorrhages were noted in the skin of the body around the umbilicus. Six hundred cc. of clear yellow fluid was present in the abdomen. The liver edge extended 6 cm. below the right costal margin. Two hundred cc. of light yellow transudate was found in the right pleural space and 125 cc. of the same kind of fluid in the left pleural space. The lower lobes of both lungs were congested and edematous. The liver (2,890 Gm.) and the spleen (860 Gm.) were enlarged, and mottled areas were visible beneath the capsule and on the cut surface of the latter. The kidneys were pale. Several retroperitoneal lymph nodes were firm and large. Grayish red marrow filled the trabeculae of the ribs.

The cerebral meninges were thin and fairly translucent. A cerebellar pressure cone of moderate size was present around the medulla. What appeared to be petechiae were numerous on the cut surface of the white matter of both frontal lobes. The spinal meninges were slightly thickened and opaque, having a milky color. The parenchymal vasculature was unusually prominent. There were no other grossly visible changes in the cord.

Microscopically, large bizarre cellular elements were found in the leptomeningeal meshes and in the Virchow-Robin spaces surrounding the vessels of the gray and white matter in the brain and cord (fig. 1). In Nissl, hematoxylin-eosin and Giemsa preparations (particularly well demonstrated in the last) the nuclei of these cells were found to be big, vesicular and light or dark blue, and not infrequently in mitosis. The cytosomes were scant and faintly tinted (light pink); granules were seen in some cytosomes but were absent in most. These elements were myeloblasts and "early" (types A and B) myelocytes, the youngest cells predominating.

Most striking in the sections of the spinal cord and medulla examined was the extensive invasion of the nerve roots (figs. 2 and 3). Not only had the myeloid cells entered the fasciculi of the cranial and spinal nerves but there was also an accompanying Schwann cell proliferation, indicating a reparative process consequent on demyelination. Microglia and astrocytes were increased in number in the posterior horns of the cord, and exquisite "axonal" cell change (swelling of neuron, "ground glass" appearance of cytoplasm and nuclear excetration) featured the motor cells of the anterior horns. The ganglion cells of Clark's columns were reduced in number.

In a very few places the malignant cells had penetrated the molecular layer of the cerebral cortex and the most superficial

part of the cord, but not to considerable distances. "Marginal gliosis" had taken place in the gray matter immediately underlying the meninges, where the usually sparse meningeal infiltration was heavy. This too was only minor in degree.

"Chronic" cell change characterized a few neurons of the vestibular nuclei of one eighth cranial nerve.

The same myeloblasts were found in the sinuses of the lymph nodes and, as leukemic infiltrations, invaded the spleen, the liver, the adrenal, the pancreas and the pulmonary alveoli. Many such cells, with big nuclei sometimes containing nucleoli and occasionally with a few granules in their cytoplasm, practically constituted the myeloid portion of the marrow, the amount of erythropoietic tissue of which was in abeyance.

COMMENT

In the absence of extensive intramedullary cellular invasion, hemorrhages or infarcts, or compression of the cord by meningeal tumor formation, it is believed that the paraplegia which was so striking in the clinical picture of this patient resulted because of damage to the anterior and posterior roots of the spinal nerves. This is confirmed microscopically by the "axonal" type of cell change (similar to what is seen with section of the motor nerves) in the ganglion cells of the anterior horns of the spinal cord and by the presence of astrocytic proliferation and paucity of Clark's column cells in the posterior horns. The same mechanism undoubtedly accounted for dysfunction of the cerebral nerves.

SUMMARY

Clinically the most prominent features of acute (myeloblastic) myelogenous leukemia occurring in a man aged 39 were evidence of peripheral injury to cranial nerves and flaccid paraplegia of the lower extremities. Invasion of nerve roots by the leukemic cells was of principal interest pathologically and is thought to account for the bizarre manifestations seen during life.

310 Cedar Street.

IMPROVED METHOD OF STAINING WITHIN TISSUES. LEPTOTRICHES OF PARINAUD'S CONJUNCTIVITIS AND GRAM-POSITIVE MICRO-ORGANISMS

F. H. VERHOEFF, M.D., BOSTON

Judging by my own experience, it is always possible by means of the staining method¹ described by me in 1913 to demonstrate leptotriches in any section which contains one or more of the characteristic foci of leptotrichosis conjunctivae² (Parinaud's conjunctivitis). Assuming that this disease is as frequent in many other localities as it is in Boston (two or three cases a year), failure by other investigators to find these micro-organisms has often been due to the employment of faulty technique. Judging by sections that have been sent to me, a common error is failure to exercise sufficient care in making the biopsy. Only a small bit of tissue need be excised, but since the leptotriches can be readily found only in the foci of macrophages it is essential to include at least one of the gray areas, preferably the largest, that can be seen just beneath the surface of the lesion.

Since the leptotriches of leptotrichosis conjunctivae as they occur in the tissues are completely decolorized by the ordinary Gram or Gram-Weigert method, strictly speaking they may be said to be gram negative. Yet in a sense they are gram positive, since after they are stained in methyl rosaniline the use of compound solution of iodine is necessary to prevent their decolorization by the procedure I have employed. The essential difference between this procedure and the Gram method lies in the successive employment of different solvents for brief periods of time. If alcohol alone, as in the ordinary Gram method, or aniline alone, as in the Gram-Weigert method, is used as the solvent, by the time the tissues are sufficiently decolorized the leptotriches are completely decolorized. In my method, before

From the Howe Laboratory of Ophthalmology, Harvard Medical School, and the Massachusetts Eye and Ear Infirmary.

1. Verhoeff, F. H.: Parinaud's Conjunctivitis: A Mycotic Disease Due to a Hitherto Undescribed Filamentous Organism. *Arch. Ophthalm.* 42: 345, 1913.

2. Verhoeff, F. H.: Observations on Parinaud's Conjunctivitis, Leptotrichosis Conjunctivae, *Am. J. Ophthalm.* 1: 705 (Oct.) 1918.

the micro-organisms become decolorized to an important extent by alcohol the sections are transferred to a different kind of solvent. This washes away the alcohol and further decolorizes the tissues, but before it can permeate and decolorize the leptotriches the sections are transferred to oil, which checks the decolorization. Further differentiation is similarly obtained by transferring the sections alternately to oil and alcohol. Success of this method apparently means that to the solvents the leptotriches are less permeable than the surrounding tissues.

In my original method chloroform was employed as one of the solvents. Recently Mr. Thomas Blake, technician in the Howe Laboratory, on his own initiative has tried other solvents as substitutes for chloroform, namely orthochloroaniline, tetrachloroethylene, methyl aniline, carbon tetrachloride and trichloroethylene. We have found that of these, trichloroethylene provides certain advantages over chloroform. The chief advantages are that it lessens the danger of overdecolorization and causes few if any precipitates in the sections. When precipitates occur, they may be removed by the subsequent treatment without danger of decolorization of the leptotriches. Another advantage is that it renders the method as satisfactory after fixation with Zenker's solution as after fixation with solution of formaldehyde. By the chloroform method, we had found it extremely difficult after fixation with solution of formaldehyde to avoid complete decolorization of the leptotriches. We have found that in the new method the time of staining with methyl rosaniline can be reduced to two minutes. The chief disadvantage of the trichloroethylene is that it is apt to leave the tissue cells and infiltrating cells deeply stained, so that the masses of leptotriches may not be so easily recognized under low magnification as when chloroform is used. This, however, is offset by the fact that the leptotriches are more deeply stained. Another disadvantage is that trichloroethylene is decomposed by exposure to light and when not in use must therefore be kept in the dark.

The details of the modified Gram stain as now employed in this laboratory are as follows:

Fix fresh tissue in Zenker's solution or solution of formaldehyde.

Embed in celloidin or paraffin. Celloidin sections are the more readily manipulated.

Cut sections as thin as possible, not more than 10 microns in thickness.

Stain sections in hematoxylin and eosin.

Mount, examine and select sections that contain the largest foci of macrophages.

By the aid of xylene remove the selected sections from the slide and wash in oil of thyme, then in 95 per cent alcohol and then in water. (Hematoxylin may be removed by acid alcohol, but this is not necessary.) If large foci of macrophages have been found, adjacent unstained sections will undoubtedly also contain them and may therefore be used instead.

The solvents now to be used are placed in small receptacles such as ordinary salt cellars. Celloidin sections are to be immersed in these. In the case of paraffin sections the solutions are to be dropped on the slides by means of eye droppers. Water is placed in large finger bowls.

Place the celloidin section from the water on a slide. Wipe away any excess of water and drop on the section Stirling's crystal violet (methyl rosaniline 5 Gm., 95 per cent ethyl alcohol 10 cc., aniline 2 cc., water 88 cc.). After two minutes,

Float the section from the slide into a bowl of water. Wash in several changes of water; this requires about two minutes.

Immerse in compound solution of iodine, from twenty to sixty seconds (iodine 1 Gm., potassium iodide 2 Gm., water 100 cc.).

Wash in water and transfer to

95 per cent alcohol. Stir the section around until the stain begins to come out freely, about five seconds, and then transfer quickly to

Trichloroethylene.³ Stir the section around until the color ceases to come out freely, about ten seconds; transfer to

Oil of thyme one minute, then to

95 per cent alcohol five seconds and again to

Oil of thyme. Examine on the slide under the low power of the microscope. If precipitates are present, or differentiation

is insufficient, differentiate further by alternate immersions in 95 per cent alcohol and oil of thyme, five seconds each.

Wash in xylene, two changes and

Mount in cedar oil on a slide.

By this method the leptotriches should be deeply stained and easily recognizable when occurring, as is usually the case, in masses. Isolated leptotriches will probably not be recognized by inexperienced observers. If no leptotriches are visible, other structures such as fibrin, granules of mast cells and chromatin may possibly be mistaken for them by those who have never seen these micro-organisms. When leptotriches are present in masses, however, their appearance is so characteristic and so different from any other structures in the tissues that they are easily identified.

For the staining of gram-positive micro-organisms and fibrin within tissues, I have found this method (and also the chloroform method) superior to the ordinary Gram or Gram-Weigert method. In the case of gram-positive bacteria, if desired, the differentiation can be carried further in each of the solvents until the fibrin is decolorized. In the only case of sporotrichosis in which I have applied this method to sections I succeeded in staining the sporotriches. By this method I have been able to stain meningococci within sections in spite of the fact that these cocci are gram negative. Possibly the method may be found useful for the demonstrating of still other gram-negative micro-organisms within tissues.

243 Charles Street.

Council on Pharmacy and Chemistry

NEW AND NONOFFICIAL REMEDIES

THE FOLLOWING ADDITIONAL ARTICLES HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON PHARMACY AND CHEMISTRY OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO NEW AND NONOFFICIAL REMEDIES. A COPY OF THE RULES ON WHICH THE COUNCIL BASES ITS ACTION WILL BE SENT ON APPLICATION.

PAUL NICHOLAS LEECH, Secretary.

EUCATROPINE HYDROCHLORIDE (See New and Nonofficial Remedies, 1940, p. 113).

Eucatropine Hydrochloride-Werner.—A brand of eucatropine hydrochloride-N. N. R.

Manufactured by the Werner Drug & Chemical Co., Cincinnati, Ohio. No U. S. patent or trademark.

PROCAINE HYDROCHLORIDE-UPJOHN (See New and Nonofficial Remedies, 1940, p. 83).

The following dosage forms have been accepted:

Hypodermic Tablets Procaine Hydrochloride 0.05 Gm. (3/4 grain). Each tablet contains procaine hydrochloride 0.05 Gm. (3/4 grain) with sodium chloride as a base. One tablet dissolved in 1 cc. of distilled water makes a 5 per cent solution of procaine hydrochloride.

Hypodermic Tablets Procaine Hydrochloride 0.02 Gm. (1/2 grain) with Epinephrine 0.025 mg. (1/2,500 grain): Each tablet contains procaine hydrochloride 0.02 Gm. (1/2 grain), epinephrine 0.025 mg. (1/2,500 grain), sodium chloride 0.013 Gm., benzoic acid 0.3 mg., sodium bisulfite 0.125 mg. and boric acid 2.27 mg. One tablet dissolved in 1 cc. of distilled water makes a 2 per cent solution of procaine hydrochloride.

SODIUM CACODYLATE (See New and Nonofficial Remedies, 1940, p. 109).

The following further dosage forms have been accepted:

Cheplin's Solution of Sodium Cacodylate with Benzyl Alcohol 0.05 Gm. (3/4 grain), 30 cc. vial: Benzyl alcohol 1 per cent is added for its local anesthetic effect.

Cheplin's Solution of Sodium Cacodylate with Benzyl Alcohol 0.2 Gm. (3 grains), 30 cc. vial: Benzyl alcohol 1 per cent is added for its local anesthetic effect.

Cheplin's Solution of Sodium Cacodylate with Benzyl Alcohol 0.3 Gm. (5 grains), 30 cc. vial: Benzyl alcohol 1 per cent is added for its local anesthetic effect.

Cheplin's Solution of Sodium Cacodylate with Benzyl Alcohol 0.5 Gm. (7 1/2 grains), 30 cc. vial: Benzyl alcohol 1 per cent is added for its local anesthetic effect.

Cheplin's Solution of Sodium Cacodylate with Benzyl Alcohol 0.065 Gm. (1 grain), 1 cc.: Benzyl alcohol 1 per cent is added for its local anesthetic effect.

THIAMIN CHLORIDE (See New and Nonofficial Remedies, 1940, p. 528).

The following dosage forms have been accepted:

Tablets Thiamine Hydrochloride, 5 mg.

Prepared by Frederick Stearns & Co., Detroit, Mich.

Tablets Thiamine Hydrochloride, 10 mg.

Prepared by Frederick Stearns & Co., Detroit, Mich.

3. Obtainable from the Eastman Kodak Company.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, NOVEMBER 2, 1940

THE PLATFORM OF THE AMERICAN MEDICAL ASSOCIATION

The American Medical Association advocates:

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.
2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.
3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.
4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.
5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.
6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.
7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.
8. Expansion of public health and medical services consistent with the American system of democracy.

THE PHYSICAL STANDARDS UNDER SELECTIVE SERVICE

In the section of THE JOURNAL devoted to medical-military preparedness in this issue appears an abstract of the standards which have been adopted to guide the physicians who will be associated with local selective service boards and medical advisory boards and also the specialists who will be associated with the induction boards. The manual is essentially the same for all of these groups. Every physician will find it informative to study carefully these standards, bearing in mind that the purpose is to select men capable of undergoing military training and not essentially an inventory throughout the nation of the health of men from 21 to 35 years of age.

In the selective service of 1917 each of the young men who appeared before a local board was given a physical examination. Under the present system only

those men will be physically examined who have been found suitable for training after exemption has been considered from the point of view of marriage, essential occupation or some of the many other reasons which have been considered sufficient to exempt the young man from military service. The selective service organization has prepared six pamphlets in which the various aspects of the work of the selective service boards are discussed. Especially noteworthy is the excellent section on malingering in the pamphlet on physical standards, which will find application not only in the work of the selective service boards but no doubt in the practice of every physician who examines any number of persons for insurance, for industry, or for educational or other purposes.

As has been previously mentioned, a final examination, which is the one made by the induction board, will be necessary before any young man is sent for training to a camp or cantonment. That examination will be made by a group of specialists who will be given the necessary facilities and time for a study much more comprehensive than can be made by either the examiner for the local selective service board or the medical advisory board.

Especially noteworthy also are the new regulations regarding serologic examination, not duplicated, as far as we know, in any other country or by this country in any previous emergency. Special interest taken by the United States Public Health Service in this phase of health or disease is reflected in this procedure. Every young man who receives a physical examination by a physician associated with the selective service board will have a serologic test. If the test is positive, it is to be repeated. Apparently those who have syphilis with remedial manifestations—except those with cerebrospinal, cardiovascular or visceral syphilis—will be placed in class 1A, which is the group considered to be qualified for general military service. Presumably the decision as to how much attention is to be given to the presence of syphilis will rest with the military authorities after induction into the service.

EXPERIMENTAL HYPERTENSION

The probability of developing therapeutic measures to cure or ameliorate a clinical condition is greatly enhanced when it is possible to produce a similar situation experimentally in animals. Such studies have been of inestimable practical value and it is not surprising, therefore, in view of the importance of the condition, that much investigative effort has been expended in an effort to produce experimentally in animals an elevation of the blood pressure which might be comparable to clinical hypertension. Much information has been accumulated as a result of research in this field; in this connection a recent review by Blalock¹ is timely and merits consideration.

1. Blalock, Alfred: *Physiol. Rev.* 20:159 (April) 1940.

In general, research activity into the cause of hypertension has followed along two lines, one involving a study of hypertension effected by procedures carried out on the central nervous system, the other dealing with experimental hypertension of renal origin. With regard to the hypertension that is generally considered to be of nonrenal origin, it seems certain that section of the moderator nerves results in an elevation of the blood pressure, usually of temporary nature, although it may sometimes be sustained. Whether or not there is any relationship between this type of hypertension and the clinical manifestation in man is, of course, problematic. Although it is true that increased vasoconstriction is present in both essential hypertension and experimental hypertension due to removal of the moderator nerves, it does not necessarily follow that essential hypertension is due to a derangement of the carotid sinus and aortic depressor nerve mechanisms. Indeed, it has been pointed out by Nowak and Walker² that the similarity lies in the end result rather than in the cause. The elevation of blood pressure effected by increased intracranial pressure has also been studied. However, a review of the pertinent literature¹ evokes the impression that this type of hypertension cannot be produced with great regularity and is usually not lasting. Cerebral anemia produced by progressive occlusion of the various cerebral arteries also results in an elevation of the blood pressure.² Nevertheless it is doubtful whether this method is of practical value as a consistent means of producing chronic hypertension.

At the present time interest is centered particularly on experimental hypertension of renal origin. The problem has been approached experimentally from many different angles. Thus, some investigators have studied the production of a condition resembling glomerulonephritis in animals, many have investigated the effect on blood pressure of damage to the kidneys or of nephrectomy, including subtotal nephrectomy by various methods, and other investigators have carried out research on the effect of occlusion of the ureters or of constriction of the renal arteries. Hypertension resulting from constriction of the renal arteries is of particular interest, and fundamental work in this connection has been carried out by Goldblatt³ and his associates. Depending on the degree of constriction of the renal arteries, hypertension either with or without a disturbance of renal function may be produced. The observation that bilateral renal ischemia may result in a persistent elevation of the blood pressure has made possible the regular experimental production in animals of a condition analogous to one encountered in cases in man. Within the past few years the mechanism which is responsible for the production of hypertension by renal ischemia has been intensively investigated. Evidence has been accumulated which indicates strongly that it is not a nervous mechanism. Similarly, it would

seem that although the endocrine glands are important in determining the degree of response they are not essential for the development of renal hypertension, associated with renal ischemia. The possibility that a chemical mechanism is involved in this increase in blood pressure is at present receiving considerable attention. Experimental evidence is available which supports the view that the hypertension associated with renal ischemia is the result of the action of a pressor substance which is formed in the kidney and enters the blood stream. Moreover, experiments indicating the exclusion of other possible mechanisms also argue indirectly in favor of a humoral factor. It is interesting to note that renin, a renal pressor substance (which is now believed to require the presence of an activator to be effective), was first described more than four decades ago.

Although it is, of course, to be granted that some types of hypertension are of nonrenal origin, most instances of experimental and probably of clinical hypertension, according to Blalock, would seem to be related to some abnormality in the function of the kidneys. In this connection it is interesting to refer to Karsner's⁴ recent statement that failure to demonstrate any signs of renal incompetence in life is not indicative of the absence of arteriolar disease of the kidneys. In any case investigations on experimental hypertension have afforded much valuable information and will certainly continue to do so.

Current Comment

IS THERE A SHORTAGE OF INTERNS?

Not infrequently one hears that hospitals cannot secure acceptable interns because there are not enough to go around and that the number of graduates from approved medical schools is insufficient to supply the needs of the hospitals which offer to train interns. Granted that there can never be an exact correspondence between the supply and the demand for interns, it seems worth while to consider whether the available medical graduates are now distributed in accordance with the legitimate needs of the institutions they serve. In many of the best teaching hospitals the house staff bears a ratio to the annual admissions of 1:400 or 1:450. In private institutions the ratio may be as high as 1:600 or 1:800. In the New York Metropolitan area there are at least forty-five hospitals with a house staff in excess of 1:400, ten of them in excess of 1:200. Why do these hospitals employ so many more interns and residents than other institutions which maintain unimpeachable educational standards? Apparently all the hospitals which operate with an excessively large house staff also maintain an ambulance service, and a substantial part of the intern's time is devoted to ambulance duty. For example, in one of the city hospitals each intern is required to spend four months out of twelve "riding the ambulance." In a private hospital the junior interns spend half their time in the ambulance service.

2. Nowak, S. J. G., and Walker, I. J.: *New England J. Med.* 220: 269 (Feb. 16) 1939.

3. Goldblatt, Harry: *Ann. Int. Med.* 11:69 (July) 1937.

4. Karsner, H. T.: *Internat. Clin.* 2:1 (June) 1938.

If ambulance calls were in reality medical emergencies this experience might be of value to the intern; most of the calls, however, are for transfers or other services which contribute nothing to the education of the physician. These functions could as well be performed by nurses or orderlies; certainly such experience is out of place in an accredited program for the training of interns. Elimination of this undesirable feature of the intern's education (?) in New York City would release a substantial number of interns for service elsewhere.

DYSENTERY AND ESCHERICHIA COLI DEFICIENCY

According to Razi Maner,¹ staff physician of the Turkish army, the colon bacillus is an essential part of the normal defense against enteric infections. From this he concludes that typhoid, paratyphoid and dysentery infections are essentially due to a qualitative deficiency in normal intestinal flora. The present clinical interest in bacterial antagonism dates from Nissle's² study of the "antagonistic index" between *Escherichia coli* and *Eberthella typhi*. He found that many strains of the colon bacillus are able to kill or completely inhibit the growth of typhoid bacilli when the two antagonistic species are inoculated together in the same culture medium. The ratio of growth of the antagonistic microorganisms was designated by him as the "antagonistic index." With many strains of *Escherichia coli* the index was 100:0, no viable typhoid bacilli being demonstrable in the resulting mixed culture. Weaker strains of the colon bacillus gave indexes varying from 100:10 to 100:103 or even as low as 100:4,050. He found that the index is a stable characteristic of different colon strains, being retained without appreciable change during many months of artificial cultivation. Gundel,³ Kamada,⁴ Rizzi⁵ and others afterward extended this study to the paratyphoid bacillus, staphylococcus, streptococcus and anthrax bacillus. They found that the colon bacillus is antagonistic to each of these pathogenic forms. Maner's current contribution is a statistical survey of dysentery antagonism. Fifty-four colon strains and three dysentery species were titrated for their antagonistic indexes. In his hands the antagonistic index is considerably stronger against dysentery bacilli than that against organisms previously studied. The Turkish clinician found that *Escherichia coli* isolated from dysentery stools is invariably deficient in antagonistic characters, in all cases the symptoms being associated with a qualitative *Escherichia coli* deficiency. He emphasizes the fact, however, that much more extensive statistical evidence must be collected before qualitative *Escherichia coli* deficiency can be accepted as the essential etiologic factor in bacillary dysentery. The possibility of preventing or treating enteric disease by implantation of highly antagonistic strains of *Escherichia coli* is now under investigation in European clinics.

CAPTAIN ENGLAND—YELLOW FEVER VOLUNTEER—RETIRES

Some forty years has passed since the United States Army Yellow Fever Commission conducted its famous experiments in Cuba. Previously epidemics of yellow fever had prevailed in the United States and had taken many thousands of lives. When Major Reed and his associates began the experiments in Cuba, yellow fever still was a serious threat to American soldiers. Reed called for volunteers to submit to experiments designed to discover the method of transmission of yellow fever. Fourteen volunteers were bitten by mosquitoes which had fed on patients sick with yellow fever, and all became ill. Six volunteers were infected by the injection of blood from patients ill of yellow fever and all became ill. Two volunteers were given injections of filtered blood serum from yellow fever patients and both became ill. Seven volunteers exposed themselves to fomites but not one became ill. In the last group was Thomas M. England, then a private in the Army Medical Department on duty in the typhoid ward. Now Captain England of the Medical Administrative Corps of the Army, he retired October 31 after forty years of active service. Captain England was born in Chillicothe, Ohio. His service is distinguished not only by participation in the experiments that enabled this country to become free from yellow fever; he remained in Cuba two years longer and then served in the Philippine campaign, for which he was cited for bravery under fire. He also served on the Mexican border in 1916 and went to France in 1918 with the Thirty-Third Division and there was promoted to Captain. He has served since then in the Office of the Surgeon General, at San Francisco, at the Fifth Corps Area headquarters in Columbus, Ohio, and at the corps area headquarters in New York. Captain England now will make his home in Columbus.

RIBOFLAVIN IN THE TUBERCLE BACILLUS

Two years ago, Boissevain and his colleagues¹ of Colorado Springs studied the melting point and absorption spectrum of the fluorescent yellow pigment formed by the tubercle bacillus. Their data suggested a close similarity of this pigment with vitamin B₂ (riboflavin). Street and Reeves² of Yale University School of Medicine have recently supplemented this evidence by a study of the growth response of riboflavin-deficient rats to this pigment. Young albino rats were reared to a stunted growth on a riboflavin-deficient diet and were then given the same diet plus a daily dose of 40 micrograms (0.04 mg.) of the tubercle flavin. Within the limits of the experimental error the growth response to this pigment was identical with the growth response of control rats in which the deficiency diet had been supplemented by a daily addition of 40 micrograms of crystalline riboflavin. The evidence seems complete, therefore, that the yellow fluorescent pigment formed by the tubercle bacillus is identical with riboflavin. From 13 to 19 mg. of this bacterial riboflavin can be isolated from 1 Kg. of dry tubercle bacilli.

1. Maner, Razi: *Ztschr. f. Hyg. u. Infektionskr.* 122:17 (Dec.) 1939.
2. Nissle: *Deutsche med. Wchnschr.* 42:1181 (Sept. 28) 1916.
3. Gundel, M.: *Zentralbl. f. Bakt.*, part 1, 104:463 (Nov. 22) 1927.
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MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

COORDINATING COMMITTEE APPOINTS SUBCOMMITTEES

Subcommittees on medical education, hospitals, industrial medicine, dentistry, nursing and Negro health have been announced by the Health and Medical Committee of the Council of National Defense. The general committee, headed by Dr. Irvin Abell of Louisville, Ky., former President of the American Medical Association, was appointed by President Roosevelt on September 19 to survey and coordinate the medical resources of the country in the interests of national defense.

Announcement of the subcommittees was made by Dr. Abell from his office at the Public Health Service Administration Building in Washington. Dr. C. Sidney Burwell, dean, Harvard Medical School, Boston, was named chairman of the subcommittee on medical education. Other members of this group are Dr. L. R. Chandler, Stanford University Hospital, San Francisco; Dr. Harold S. Diehl, dean of the University of Minnesota Medical School; Dr. Willard C. Rappleye, commissioner of hospitals of the city of New York, and Dr. John H. Musser of the Tulane University of Louisiana School of Medicine, New Orleans.

The subcommittee on hospitals includes Dr. Winford H. Smith, director of Johns Hopkins Hospital, Baltimore, chairman; Rev. Alphonse M. Schwittalla, president, Catholic Hospital Association of United States and Canada, St. Louis; Dr. Malcolm T. MacEachern, associate director of the American College of Surgeons, Chicago; Dr. Claude W. Munger, chairman of the defense committee of the American Hospital Association, New York, and Dr. Nathaniel W. Faxon, superintendent of the Massachusetts General Hospital, Boston.

The subcommittee on industrial medicine was set up with Dr. Clarence D. Selby, medical consultant of General Motors Corporation, Detroit, as chairman. Other members of this subcommittee included Prof. Philip Drinker, Harvard School of Public Health, Boston; Dr. E. C. Holmblad, Chicago; Dr. George M. Smith, Yale University Medical School, New Haven, Conn.; Dr. Lloyd Noland, chief surgeon, Tennessee Coal, Iron and Railroad Company, Fairfield, Ala.; Mr. William P. Yant, Mine Safety Appliance Company, Pittsburgh, and Dr. A. J. Lanza of the Metropolitan Life Insurance Company, New York.

A subcommittee on dentistry was named with the following members: Dr. C. Willard Camalier, Washington, D. C., former president of the American Dental Association, chairman; Dr. John T. O'Rourke, dean of the University of Louisville School of Dentistry; Dr. Leroy M. S. Miner, dean of the Harvard University Dental School, Boston; Dr. Frederick B. Noyes of Chicago and Dr. Guy S. Millbury of San Francisco, former dean of the Dental School of the University of California.

Miss Mary Beard, director of nursing of the American Red Cross, was named chairman of a subcommittee on nursing, and Dr. M. S. Bousfield of the Julius Rosenwald Fund, Chicago, will head a subcommittee on Negro health.

In announcing these subcommittees, Dr. Abell stated that these subcommittees would assist the Defense Council's Medical Committee in coordinating health and medical activities and in "mobilizing the medical resources of the nation for national defense."

Other members of the Health and Medical Committee on national defense as appointed by the President and the National Defense Council are Major General James C. Magee, Surgeon General of the Army; Rear Admiral Ross T. McIntyre, Surgeon General of the Navy; Dr. Thomas Parran, Surgeon General of the United States Public Health Service, and Dr. Lewis H. Weed, chairman of the Division of Medical Sciences of the National Research Council.

The general committee has already had two meetings and, in addition to setting up its various subcommittees, has considered the need for developing research projects dealing with special problems of military medicine and hygiene. Examples of such special problems are finding better methods of treatment of war wounds, exploring the most modern usages of recently discovered chemicals in the treatment and prevention of disease, problems of aviation medicine, and the most effective measures for the control of the venereal diseases.

The committee is also concerned with the necessity for providing health services in areas surrounding military camps and cantonments and with the health and medical problems arising as a consequence of the greatly expanded industrial development in certain regions of the country.

The committee hopes to find ways and means of providing adequate medical facilities and personnel, including hospitals, physicians and surgeons, dentists and nurses for the armed forces of the nation without the serious disruption of these essential services on the home front. It is enlisting the services and coordinating the efforts of both governmental and private agencies in building up the health and medical facilities of the nation as part of the present peacetime mobilization.

EXAMINATION FOR ARMY MEDICAL CORPS

An examination of applicants for appointment as first lieutenant, Medical Corps, U. S. Army, will be held within the continental limits of the United States, March 10-13, 1941, inclusive. Applications and requests for information concerning this examination should be addressed to the Adjutant General, U. S. Army, Washington, D. C. Applications received after Feb. 20, 1941, will not be considered.

PHYSICAL STANDARDS UNDER SELECTIVE SERVICE

The physical standards governing the physical examination of registrants by the examining physicians of the Selective Service system are the same as those which have been developed by the United States Army Medical Corps for the examination of selected men at Army and Navy induction stations. The objective is to procure men who are physically fit for the rigors of general service. In brief the regulations say:

The registrant must be able to see well; have comparatively good hearing; have a heart able to withstand the stress of physical exertion; be intelligent enough to understand and execute military maneuvers, obey commands, and protect himself; and be able to transport himself by walking as the exigencies of military life may demand. Examining physicians will accordingly so construe these standards that the objective stated above may be realized.

Registrants are to be placed in three classes according to physical standards, which will make them acceptable for general military service, for limited military service or reject them for any military service. The physicians of the draft boards are to make a complete examination and to record minor defects as well as disqualifying defects. The Medical Advisory Boards are to make additional and repeated examinations and special reports. In localities where there is no provision for serologic and other laboratory work, the examining physicians will consult municipal or state health authorities, the United States Public Health Service or other federal agencies.

The examiners are not permitted to give an anesthetic to a registrant without his voluntary consent for the purpose of examination or to aid in the diagnosis of defects.

The final decision as to the acceptance or rejection of men will, of course, rest with the physicians at the induction stations.

Reportable diseases are to be notified to appropriate civil authorities when found by the examining physicians of the Selective Service boards.

Venereal Disease

The regulations regarding venereal disease follow:

a. Whenever the history or the physical examination of a registrant indicates the possibility of venereal disease, the matter shall be thoroughly investigated, employing such additional examinations and laboratory tests as are deemed necessary to determine the presence of disqualifying sequelae or of contagiousness. A serological test for syphilis shall be made on every registrant as part of his physical examination. The blood specimen will be taken by the examining physician in containers furnished by the State Health officer and forwarded to the State Laboratory or other laboratory designated by State Selective Service Headquarters, together with the accomplished forms prescribed within the State for such purpose. A second serological test shall be completed promptly and prior to his call for induction on every registrant whose first test is reported positive. The dates and results of such examinations and tests shall be noted on the Report of Physical Examination (Form 200).

b. A diagnosis of syphilis shall not be made on the basis of a single positive serological test in the absence of definite clinical manifestations of the disease.

c. A diagnosis of latent syphilis shall be made on a registrant who has no clinical manifestations of the disease, but whose blood serum has been found positive by a second serological test performed under these regulations and within three months of the first positive serological examination.

d. Syphilis shall be considered contagious only in the presence of skin or mucous membrane lesions manifested within five years from the date of infection.

Each board is to have one physician, but additional appointments may be made if more than one examining physician is needed. An examining physician is not permitted to examine for a board any registrant who is a first cousin or a closer relation, either by blood or by marriage, or who is an employer or an employee, or who stands in the relation of superior or subordinate in connection with any employment, or is a partner or close business associate of the physician. In such instances the board may request another physician or the use of the examining physician of another board.

Each of the Advisory Boards is to have, if practicable, internists, eye, ear, nose and throat specialists, orthopedists, surgeons, psychiatrists, clinical pathologists, radiographers and dentists.

Cases Sent to Medical Advisory Boards

The local board will send registrants to the nearest Medical Advisory Board whenever the examining physician or the government appeal agent so requests or whenever a majority of the local board is dissatisfied with the conclusions of the examining physician.

Standards and Minimum Acceptable Measurements of Height, Weight and Circumference of Chest

Standard			Minimum	
Height, Inches	Weight, Pounds	Chest Measurement at Expiration, Inches	Weight, Pounds	Chest Measurement at Expiration, Inches
60	116	31½	105	28¾
61	119	31½	107	29
62	122	31¾	109	29¼
63	125	32	111	29½
64	128	32¾	113	29¾
65	132	32¾	115	30
66	136	32¾	117	30¼
67	140	33	121	30½
68	144	33¾	125	30¾
69	148	33¾	129	31
70	152	33¾	133	31¼
71	156	34	137	31½
72	160	34¼	141	31¾
73	164	34½	145	32
74	168	34¾	149	32¼
75	172	35	153	32½
76	176	35¼	157	32¾
77	180	35½	161	33
78	184	35¾	165	33¼

Any one with an infectious disease will obviously not be selected for military service. If, however, he has recovered from such a condition and has not had any complications which remain permanently, he would be inducted. If he is drawn in the selective service at the time when he is ill, his acceptance is merely deferred until final examination shows that he has recovered.

This applies also to malaria, hookworm or to any recent injury such as wound of the hand. The existence of such an injury will not bar the young man from service but would merely defer his acceptance.

On the other hand, the presence of cancer or any other malignant disease, of active tuberculosis, leprosy, rheumatic fever or severe infection of the bones—or even severe hookworm infection, which might require months

for recovery—would be sufficient to put the registrant in the class that is not to be called for any type of military service.

In the accompanying table are given standards and minimum acceptable measurements of height, weight and the circumference of the chest.

Any one who falls within these standards is considered suitable for general military service, even one whose weight is greater than the standard indicated for the height, provided the overweight is not sufficient to interfere with military training. Thus the mere fact that a man is overweight will not in itself bar him from military service. Such a man may be selected for limited service or special service, provided he is not otherwise mentally and physically unfit.

The army cannot use men who are "outsize." The man who is less than 60 inches in height or less than 105 pounds in weight is simply too small for the army; the giant has the same trouble. Any one who is more than 6 feet 6 inches tall or whose weight is far out of proportion to his height is also considered to be outsize and will not be inducted into regular military service.

The examining board is given a good deal of discretion in matters of weight and height. If, in the opinion of the board, proper food and physical training will make a man capable of giving service, he is likely to be inducted into the service and to get just the proper food and training necessary to make him a physically fit specimen.

Eyes

Vision.—To determine the acuity of vision, place the person under examination with his back to a window at a distance of 20 feet from the test types. Examine each eye separately, without glasses, covering the other eye with a card (not with the hand). The registrant is directed to read the test types from the top of the chart down as far as he can see, and his acuity of vision is recorded for each eye, with the distance of 20 feet as the numerator of a fraction and the size of the type of the lowest line he can read correctly as the denominator. If he reads the 20 feet type correctly, his vision is normal and recorded 20/20; if he does not read below the 30 feet type, the vision is imperfect and recorded 20/30; if he reads the 15 feet type, the vision is unusually acute and recorded 20/15, and so on.

Class 1-A.—*a.* Normal vision. *b.* 20/100 in each eye without glasses, if correctable with glasses to 20/40 bilateral. *c.* Conditions due to iridectomy or other operation upon the eye, if the condition for which the operation was performed has been relieved and the vision is within or above the minimum standard requirements. *d.* Slight nystagmus. *e.* Slight conjunctivitis. *f.* Chronic simple conjunctivitis occurring in regions where trachoma is not prevalent and if easily remediable. *g.* Slight adhesion of the lids to the eyeball. *h.* Small pterygium. *i.* Strabismus which does not interfere with vision. *k.* Color blindness. *l.* Exophthalmos if not of such degree as to have led to, or threatened, corneal ulceration, and provided hyperthyroidism is excluded.

Class 1-B.—*a.* A minimum vision of 20/400 in each eye without glasses, if correctable with glasses to 20/40 in either eye. *b.* Loss of one eye or blindness in one eye not due to progressive organic change, with vision in the other eye of not less than 20/200 correctable to not less than 20/40. *c.* Superficial corneal ulcer, provided acceptance is deferred until ulcer is healed without disqualifying impairment of vision. *d.* The following conditions, if mild: (1) Chronic conjunctivitis not trachomatous. (2) Inversion of eyelids. (3) Eversion of eyelids. (4) Ptosis interfering with vision. (5) Trichiasis. (6) Epiphora. (7) Chronic blepharitis. (8) Extensive pterygium. (9) Chronic dacryocystitis. (10) Blepharospasm. (11) Diplopia due to paralysis of ocular muscles of one eye, if mild.

In Class 4 are defects such as the following: *a.* Vision less than the minimum requirements for special and limited military

service. *b.* Disfiguring cicatrices of eyes. *c.* Lagophthalmus, if associated with signs of hyperthyroidism. *d.* Pronounced exophthalmus. *e.* Chronic keratitis. *f.* Chronic recurrent inflammatory disease of the globe. *g.* Deep chronic ulcer of cornea. *h.* Any active disease of the retina, choroid, or optic nerve. *i.* Detachment of the retina. *j.* Marked nystagmus. *k.* Glaucoma. *l.* Diplopia due to paralysis of extrinsic ocular muscle, unless mild in degree. *m.* Abnormal conditions of eyes due to disease of the brain. *n.* Trachoma.

There are provided for the physicians of the boards complete instructions regarding the detection of malinger and other methods of examination, also instructions regarding retinoscopy.

Ears

Examination for Disease.—The external ears and mastoid region will be examined by inspection and, if necessary, the mastoid region by palpation. The external auditory canal and membrana tympani will be examined by reflected light or by a self-illuminating otoscope.

Determination of Auditory Acuity.—Acuity of hearing will be determined by the low conversational voice test and by the audiometer when indicated. To determine the acuity of hearing, place the registrant facing at right angles to the assistant, 20 feet distant, with ear to be tested toward assistant, and direct him to repeat promptly the words spoken by the assistant. If the registrant cannot hear the words at 20 feet, the assistant should approach foot by foot, using the same tone of voice, until the words are repeated correctly. Examine each ear separately, closing the other ear by pressing the tragus firmly against the meatus; the examiner may face the same direction as the registrant and close one of his own ears in the same way as a control. The assistant should speak in a low conversational voice (not a whisper), just plainly audible to the examiner, and should use numerals, names of places, or other words or sentences until the condition of the registrant's hearing is evident. The acuity of hearing should be expressed in a fraction, the numerator of which is the distance in feet at which the words are heard by the normal ear; thus 20/20 indicates a normal hearing, 10/20 partial hearing of a degree indicated by the fraction, that is, the registrant only hears at 10 feet distance the words which a normal ear hears at 20 feet. The duties of the examiner and assistant may be reversed if desired. If any doubt arises as to the correctness of the answer given, the registrant may be blindfolded and a watch be used to determine the distance at which it can be heard, care being taken that the registrant does not know the distance from the ear at which it is being held. The watch if used should be one whose ticking strength has been tested by determining the distance at which it can be heard by a normal ear. The audiometric examination will be conducted according to the method prescribed by the manufacturers of the instrument employed, and the findings as recorded on the prescribed form will be forwarded for file with the examination report.

In Class 1-A are *a.* Normal hearing. *b.* Hearing in each ear of 10/20 or better.

In Class 1-B are *a.* Hearing in one or both ears less than 10/20 but more than 5/20. *b.* Loss of one or both external ears, if the registrant has followed a useful vocation in civil life and the deformity is not too greatly disfiguring.

In Class 4 are defects such as *a.* Hearing less than the minimum hearing prescribed under class 1-B. *b.* Chronic purulent otitis media, with or without mastoiditis. *c.* Chronic perforation of membrana tympani.

Instructions are also provided for testing for malinger with directions for Erhard's test and the Chiman-Moos test.

Mouth, Nose, Fauces, Pharynx, Trachea, Esophagus and Larynx

In Class 1-A are *a.* Normal conditions of the mouth, nose, fauces, pharynx, larynx, trachea and esophagus. *b.* Enlarged tonsils. *c.* Adenoids. *d.* Small benign tumors of the nasal and

buccal mucous membrane. *e.* Deviation of the nasal septum or enlarged turbinates which do not seriously interfere with nasal breathing. *f.* Acute primary sinusitis, provided the acceptance of the registrant is temporarily deferred for reexamination, if after a reasonable time the sinusitis has disappeared. *g.* Laryngitis manifested by hoarseness, laryngeal cough, and congestion of the vocal cords, confirmed by laryngoscopy, unless tuberculous or malignant. *h.* Alleged stricture of the esophagus which is unattended by evidence of organic disease of the esophagus as shown by a fluoroscopic examination while the registrant is swallowing a barium mixture. *i.* Perforation of hard palate, if not associated with a disqualifying disease. *j.* Moderate deformity of the structures of the mouth which does not seriously interfere with mastication or speech. *k.* Hay fever, unless severe.

In Class 1-B are *a.* Deviation of the nasal septum, which markedly interferes with nasal breathing. *b.* Aphonia, with attendant conditions, which disqualify for general military service, if the registrant has followed a useful vocation in civil life. *c.* Hay fever, if severe.

In Class 4 are defects such as *a.* Irremediable deformities of the mouth, throat, and nose which interfere with the mastication of ordinary food, with speech, or with breathing. *b.* Destructive syphilitic diseases of the mouth, nose, throat, larynx, or esophagus, if severe in degree. *c.* Laryngeal paralysis, due to pressure from aneurysm or tumor. *d.* Permanent tracheostomy. *e.* Stricture of the esophagus. *f.* Permanent gastrostomy. *g.* Chronic sinusitis of the accessory sinuses of the nose, unless mild in degree. (The diagnosis should be established on chronic nasal discharge, presence of large nasal polypi, and other signs and symptoms reinforced by transillumination or x-ray examination, or both.) *h.* Chronic atrophic rhinitis with offensive odor (ozena).

Teeth

In Classes 1-A and 1-B are *a.* Class 1-A.—(1) Normal teeth and gums. (2) A minimum of three serviceable natural masticating teeth above and three below opposing and three serviceable natural incisors above and three below opposing. (Therefore, the minimum requirements consist of a total of six masticating teeth and of six incisor teeth.) All of these teeth must be so opposed as to serve the purpose of incision and mastication. (3) Definitions: (*a.*) The term "masticating teeth" includes molar and bicuspid teeth, and the term "incisors" includes incisor and cuspid teeth. (*b.*) A natural tooth which is carious (one with a cavity), which can be restored by filling, is to be considered as a serviceable natural tooth. (*c.*) Teeth which have been restored by crowns or dummies attached to bridgework, if well placed, will be considered as serviceable natural teeth when the history and the appearance of these teeth are such as clearly to warrant such assumption. (*d.*) A tooth is not to be considered a serviceable natural tooth when it is involved with excessively deep pyorrhea pockets, or when its root end is involved with a known infection that has or has not an evacuating sinus discharging through the mucous membrane or skin. *b.* Class 1-B.—Insufficient teeth to qualify for class 1-A, if corrected by suitable dentures.

In Class 4 are *a.* Irremediable disease of the gums of such severity as to interfere seriously with useful vocation in civil life. *b.* Serious disease of the jaw which is not easily remediable and which is likely to incapacitate the registrant for satisfactory performance of general or limited military service. *c.* Extensive focal infection with multiple periapical abscess, the correction of which would require protracted hospitalization and incapacity. *d.* Extensive irremediable caries.

Skin

Class 1-A.—*a.* Normal skin. *b.* Acute nonexanthematous and noncommunicable diseases of the skin which ordinarily run a temporary course. *c.* Diseases which are trivial in character and which do not interfere with the general health and are not incapacitating. Among these common and usually trivial diseases may be enumerated (1) Acne. (2) Anomalies of pigmentation. (3) Scars not extensive, disfiguring, nor incapacitating in character. (4) Condylomas which are not extensive. (5) Staphylococcal and streptococcal skin infections. (6) Acute eczemas.

(7) Nevi which are not greatly disfiguring. (8) All forms of pediculosis. (9) All forms of ringworm, unless severe and not easily remediable. (10) Scabies, unless severe and not easily remediable. (11) Mild and not extensive psoriasis. (12) Warts. *d.* Simple ulcers or other acute defects of the skin which are easily curable. *e.* Pilonidal cyst or sinus if unattended with disease of the bone, as shown by x-ray examination. *f.* Unusual skin defects should arouse suspicion of self-inflicted lesions (dermatitis factitia).

Class 1-B.—Such defects as chronic diseases of the skin, which disqualify for general military service, if the registrant has successfully followed a useful vocation in civil life.

Class 4.—Serious or incapacitating skin disorders such as *a.* Chronic skin diseases or chronic ulcers of the skin which are so severe or so disfiguring as to incapacitate the registrant for the duties of a soldier or so disfiguring as to render the registrant objectionable in common social intercourse. *b.* Actinomycosis. *c.* Dermatitis herpetiformis of long duration. *d.* Epidermolysis bullosa. *e.* Forms of generalized dermatitis of long duration. *f.* Allergic dermatoses if severe and not easily remediable. *g.* Mycosis fungoides. *h.* Chronic pemphigus. *i.* Lupus vulgaris. *j.* Syphilitic lesions ulcerative in character showing much destruction of tissue which if healed would be unsightly or so scarring as to incapacitate the registrant for military service. *k.* Elephantiasis.

Head

Class 1-A.—*a.* Normal skull. *b.* Moderate deformities of the bones of the skull of the character of depressions, exostoses, and the like and unassociated with evidence of disease of the brain, spinal cord or peripheral nerves, and which would not prevent the registrant from wearing military headgear. *c.* Defects which are apparently temporary in character due to recent injuries. (This includes contusions and other wounds of the scalp and concussion. Registrants with these defects should have the final examination temporarily deferred.)

Class 1-B.—Osseous defects due to decompression or trephine of the skull, if asymptomatic and unassociated with bulging at the site of operation.

Class 4.—*a.* Deformities of the skull of the nature of depressions, exostoses, etc., of a degree which will prevent the registrants from wearing military headgear. *b.* Deformities of the skull of any degree associated with evidences of disease of the brain, spinal cord, or peripheral nerves. *c.* Hernia of brain; monstrosity of the head or hydrocephalus.

Spine, Scapulas and Sacro-Iliac Joints

Class 1-A.—*a.* Normal spine and scapulas. *b.* Lateral curvature of the spine of 2 inches or less from the normal midline, if the mobility and weight-bearing power are good. *c.* Fracture of the coccyx. *d.* Prominent scapulas not interfering with wearing of uniform or military equipment. *e.* Pilonidal cyst or sinus (this usually presents itself in the region between the coccyx and anus), if unattended with disease of the bone as shown by x-ray examination. *f.* Normal sacro-iliac and lumbosacral joints. *g.* Complaint of disease of the sacro-iliac and lumbosacral joints which is unassociated with objective signs and symptoms at the first examination and which, on reexamination after a reasonable period of time, is again found negative.

Class 1-B.—*a.* Lateral deviation of the spine from the normal midline of more than 2 inches and less than 3 inches. *b.* Non-tuberculous diseases of the spine which are unassociated with such rigidity that the registrant has been incapacitated from following a useful vocation in civil life. *c.* Fracture of the spine or pelvic bones which has healed without marked defects and which has not interfered with following a useful vocation in civil life. *d.* Disease of the sacro-iliac and lumbosacral joints of a degree which disqualifies for general military service, if the registrant has followed a useful vocation in civil life.

Class 4.—Defects such as *a.* Tuberculosis, either active or healed, of any portion of the vertebral column. *b.* Osteoarthritis, partial or complete, of the spinal column if sufficient in degree to interfere with following a useful vocation in civil life. *c.* Healed fractures of the vertebrae or pelvic bones with associated disqualifying rigidity. *d.* Lateral deviation of the spine from the normal midline of more than 3 inches. Curvature

of the spine (kyphosis or lordosis) of a degree sufficient to interfere with the wearing of a uniform or military equipment, or which has prevented the registrant from following a useful vocation in civil life. *c.* Disease of the sacro-iliac and lumbosacral joints which is of a chronic type and is obviously associated with pain referred to the lower extremities, muscular spasm, postural deformities, and limitation of motion in the lumbar region of the spine, and if malingering is definitely excluded.

Use of X-Rays.—When examining physicians are in doubt concerning the cause and the extent of the diseases of the vertebrae, scapulas or sacro-iliac joints, an x-ray examination should be made.

Extremities

Class 1-A.—*a.* Normal upper and lower extremities with normal function. *b.* Old or recent fractures which have healed spontaneously with no resulting impairment of function. *c.* Paralysis of a muscle or group of muscles that does not interfere with function. *d.* Benign tumors of bone or defects due to their removal when the condition does not interfere with the function of the extremity or the joint involved. *e.* Recent injury of a bone or joint with or without fracture, or dislocation which, in the opinion of the examiners, is only temporarily incapacitating. (Registrants with these defects should be given a period of time not less than six weeks for recovery before the final examination is made.) *f.* Web fingers and toes, unless severe in degree. *g.* Absent left thumb. *h.* Loss of two fingers of either hand, except a combination of right index and middle finger. *i.* Loss of right index finger, provided right middle finger is present. *j.* Scars and deformities of moderate degree of the hand or hands which do not interfere with normal function. *k.* Stiff fingers of a degree not to interfere seriously with function. *l.* Pes planus unless accompanied by marked deformity, rigidity or weakness, or is of such degree as to have interfered with useful vocation in civil life. *m.* Hallux valgus unless severe. *n.* Clubfoot of slight degree if tarsal, metatarsal, and phalangeal joints are flexible and the condition permits the wearing of a military shoe and, in the opinion of the examiner, will not interfere with the performance of military duty. *o.* Slight claw toes not involving obliteration of the transverse arch and which do not interfere with the wearing of a military shoe. *p.* Hammer toe which is flexible and which does not interfere with the wearing of a military shoe. (Hammer toe usually involves the second digit and unless it is rigid is not a disqualifying defect.) *q.* Absence of one or two of the small toes of one or both feet if the function of the foot is good. *r.* Ingrowing toenails.

Class 1-B.—*a.* Loss of thumb of right hand. *b.* Loss of three fingers of either hand, including the right index finger. *c.* Web fingers or toes, if severe in degree. *d.* Ganglion and other benign tumors of the hand or fingers. *e.* Moderate deformities of one or both upper extremities which do not and have not interfered with function to a degree to prevent the registrant from following a useful vocation in civil life. *f.* Internal derangement of the knee joint if not severe enough to have prevented him from following a useful vocation in civil life. *g.* Abduction and pronation (knock-ankle) when this condition is not associated with rigidity of the tarsal joint or with deformity of the foot. (This defect is remediable with proper foot exercises and with correct shoes.) *h.* Loss of great toe. *i.* Loss of dorsal flexion of great toe. *j.* Hammer toe with rigidity. *k.* Other defects of the feet which disqualify for general military service but do not prevent the registrant from wearing a military shoe and which have not prevented him from following a useful vocation in civil life. *l.* Moderate deformities of one or both lower extremities which do not and have not interfered with function to a degree to prevent the registrant from following a useful vocation in civil life. *m.* Adherent scars of the skin and soft tissues of an extremity. *n.* Ununited fractures which do not interfere with good function. *o.* Benign tumors of bone or joint which do not interfere with function. *p.* Healed disease or injury of wrist or elbow with resulting limitation of motion. *q.* Other defects which, in the opinion of the examining physician, are disqualifying but remediable, but which have not prevented the registrant from following a useful vocation in civil life.

Class 4.—Defects such as *a.* Loss of both thumbs. *b.* Loss of more than three entire fingers of one hand. *c.* Chronic inflammatory disease of long duration of one or more of the large joints, with or without sinuses. *d.* Tuberculosis of a bone or joint. (The diagnosis should be based upon the presence of swelling, tenderness, muscular spasm, restriction of joint motion and the evidence of bone destruction shown by x-ray examination. *e.* Old ununited fractures which interfere with function or ununited fractures with deformity sufficient to interfere with function. *f.* Old unreduced dislocations which have interfered with the registrant following a useful vocation in civil life. *g.* Disease of any bone or joint healed with such resulting deformity or rigidity that the function is impaired to a degree that it will interfere with military service. *h.* Muscle paralysis or contraction which disturbs function to the degree of interference with military service. *i.* Adherent scars of skin or soft tissue to a degree which seriously interfere with function. *j.* Varicose veins, if severe in degree or if associated with edema or ulcer of the skin. *k.* Pes planus, if accompanied by marked deformity, rigidity, or weakness, or of such degree as to have interfered with useful vocation in civil life. *l.* Obliteration of the transverse arch associated with permanent flexion of the small toes (claw toes). *m.* Hallux valgus if severe and associated with marked exostosis or bunion, especially when there are signs of irritation above the joint. *n.* Clubfoot if marked in degree or which interferes with the wearing of a military shoe. *o.* Diseases of the bone or of the hip, knee, or ankle joint which seriously interfere with function and weight bearing power. *p.* Deformities due to fracture or other injury which seriously interfere with function and weight bearing power. *q.* Sciatica which is apparently intractable and disabling to the degree of interference with the function of walking and weight bearing power. *r.* Amputations of extremities in excess of those already cited.

General Considerations.—It is important that registrants with defects of the feet which are not remediable by training and which prevent the inducted men from taking proper training should not be accepted for general military service. It is quite as important that defects of the feet which are not disabling should not be considered disqualifying for general military service.

Neck

Class 1-A.—*a.* Normal neck. *b.* Nonspastic contraction of the muscles of the neck which is not of great degree and will not prevent the wearing of a uniform or military equipment. *c.* Simple goiter or benign thyroid tumors unassociated with toxic or pressure symptoms, provided the enlargement of the thyroid will not interfere with the wearing of a uniform or military equipment. *d.* Enlarged lymph glands of the neck which are not a manifestation of systemic disease and which apparently do not interfere with the general health and which are not large enough to interfere with the wearing of a uniform or military equipment.

Class 4.—*a.* Exophthalmic goiter. *b.* Thyroid enlargement from any cause associated with toxic symptoms. *c.* Enlargement of the lymph glands of the neck associated with leukemia and Hodgkin's disease. *d.* Lymphosarcoma. *e.* Tuberculous glands. *f.* Nonspastic contraction of the muscles of the neck or cicatricial scarring which is disfiguring and unsightly or interferes with wearing a uniform or military equipment. *g.* Spastic contraction of the muscles of the neck. *h.* Simple goiter unassociated with toxic or pressure symptoms, enlarged lymph glands of the neck, benign tumors and cysts of the neck, large benign tumors of the parotid gland, if the enlargement is of such degree as to interfere with wearing a uniform or military equipment.

Lungs and Chest Wall

Class 1-A.—*a.* Normal respiratory system and chest wall. *b.* Acute bronchitis, provided acceptance is temporarily deferred until a final examination shows recovery without disqualifying sequelae. *c.* Scars of operation for empyema which have been healed for one year or longer, when the function of the lung is good. *d.* (1) Arrested pulmonary tuberculosis consisting of lesions appearing in x-ray examination as small apical scars,

small calcified nodules or localized fibrous strands, in no case exceeding minimal extent as defined in the classification of the National Tuberculosis Association, and when, in addition, in the opinion of the examining physician, this lesion is not likely to be reactivated under conditions of military service. (2) Minimal pulmonary lesions are defined as slight lesions without demonstrable excavation confined to a small part of one or both lungs. The total extent of the lesions, regardless of distribution, will not exceed the equivalent of the volume of lung tissue which lies above the second chondrosternal junction and the spine of the fourth or body of the fifth thoracic vertebra on one side. *e. Fracture of the rib or ribs, provided acceptance of registrant is temporarily deferred until a final examination shows recovery with or without deformity, and provided the residual deformity, if any, does not interfere with respiratory movements.* *f. Benign tumors of the breast or of the chest wall, provided the enlargement does not interfere with the wearing of a uniform or military equipment.* *g. Small palpable lymph glands of the axilla which apparently do not interfere with the general health.*

Class 1-B.—*a. Deformity of clavicle, ribs, or scapula of a degree disqualifying for general military service but which has not prevented the registrant from successfully following a useful vocation in civil life.* *b. Chronic bronchitis, bronchiectasis, or chronic asthma which is mild and which has not prevented the registrant from successfully following a useful vocation in civil life.*

Class 4.—Disqualifying defects such as *a. Tuberculosis of lungs or tracheobronchial lymph nodes, except as defined for Class 1-A.* *b. Fibrinous or serofibrinous tuberculous pleuritis, and pleurisy, with effusion of unknown origin. (As pleurisy, with or without effusion, is a very frequent manifestation of early tuberculosis, examining physicians should examine with the greatest care registrants who have apparently recovered from pleurisy.)* *c. Empyema, or unhealed sinuses of the chest wall following operation for empyema.* *d. Chronic bronchitis with emphysema except as stated for Class 1-B.* *e. Chronic asthma associated with chronic bronchitis and emphysema, except as stated for Class 1-B.* *f. Abscess of the lung.* *g. Bronchiectasis, if moderate or severe.* *h. Actinomycosis.* *i. Tuberculosis of the ribs and other parts of the chest wall.* *j. Tumor of the breast or of the chest wall of such size and location as to interfere with the wearing of the uniform or military equipment.* *k. Tumor of the lung, pleura, or mediastinum.* *l. Spontaneous pneumothorax.*

General Considerations.—*a. The chest examination will include the usual methods of physical diagnosis supplemented, whenever indicated, by radiographic and laboratory studies.* *b. Examining physicians should be extremely careful to reject registrants with pulmonary tuberculosis, except as defined for Class 1-A for all military service; and to accept for military service registrants who allege tuberculosis as a ground for exemption or discharge on the basis of insufficient or incorrectly interpreted signs and symptoms.* *c. Men who desire to serve their country may conceal, from patriotic motives, symptoms of tuberculosis which they know or suspect to exist. Some tuberculous individuals will seek enlistment with a view to obtaining treatment and a pension. Some soldiers may allege symptoms of tuberculosis with a view to securing discharge. Some registrants may be expected to claim the existence of tuberculosis as a ground for exemption and fortify their claims by certificates of physicians and by roentgenograms. Such certificates and roentgenograms will not be accepted, but examining physicians will satisfy themselves as to the physical qualifications of registrants by their personal examinations. There will be cases in which pulmonary tuberculosis will have been previously diagnosed on the ground of subjective symptoms and of physical signs which are without any pathologic significance. It is necessary, therefore, that conclusions of examining physicians will be based only on their own examinations. Statements of the registrant as to symptoms will not be accepted as indication of the existence of tuberculosis unless supported by objective evidence.* *d. The attention of examining physicians is particularly invited to the necessity of exercising great conservatism in their interpretation of physical signs over*

the apexes. Interpretation of such signs as indicating active tuberculosis would in many cases do the government great injustice, leading to the exclusion of men who are fit for service. *e. The following signs may arouse suspicion, but unless x-ray and other studies reveal definite evidence of disease they will be disregarded. (1) Slightly harsh breathing, slightly prolonged expiration over the right apex above the clavicle anteriorly and to the third dorsal vertebra posteriorly; the same signs at the extreme apex, left side. (2) Same signs at second interspace right anteriorly near sternum (proximity of right main bronchus). (3) Increased vocal resonance, slightly harsh breathing immediately below center of left clavicle. (4) Fine crepitations over sternum heard when stethoscope touches the edges of that bone. (5) Clicks heard during strong respiration or after cough in the vicinity of the sternocostal articulations. (6) The so-called rales at the apex during the first inspiration which follows a deeper breath than usual or a cough. (7) Sounds resembling rales at base of lung (marginal sounds), especially marked in right axilla, limited to inspiration. (8) Similar sounds heard at apex of heart on cough (lingula). (9) Slightly prolonged expiration at left base posteriorly. (10) Very slight harshness of respiratory sounds with prolonged expiration in the lower paravertebral regions of both lungs posteriorly.*

Heart, Blood Vessels and Circulation

History.—Questions may be asked during the course of the examination concerning past history of rheumatic fever, syphilis and reaction of physical effort which may be helpful in the interpretation of the observations, but reliance should not be placed on the history alone.

Procedure.—The procedure following should govern in the physical examination of the heart. Only those observations need be recorded which are indicative of disease or anatomic defect (examples of conditions which are usually not indicative of disease are extrasystoles and functional pulmonary systolic murmurs). For the information of the examiners it is suggested that reference be made to the publication of the American Heart Association entitled "The Nomenclature and Criteria for the Diagnosis of Diseases of the Heart." *a. Location and determination of character of apex impulse.* *b. Auscultation of the heart sounds over apex, lower sternum, and second and third interspaces to right and left of sternum, noting accentuation of sounds and murmurs, and rate and rhythm, and comparing apex observations with the radial pulse.* *c. Inspection of root of neck and upper thorax and percussion of first interspace on each side of manubrium for evidence of aneurysm.* *d. Count of radial pulse, observation of its rhythm, and palpation of radial arteries for unusual thickening or high tension.* *e. The blood pressure will be determined only in those cases in which it appears indicated.* *f. Exercise test (stepping twelve times briskly onto a common chair) will be used in selected cases to bring out significant heart murmurs, but this test in itself is not to be considered a reliable estimate of the functional capacity of the heart. Care will be taken that registrants with heart lesions are not placed in jeopardy by overexercise.* *g. If there is doubt as to the presence of cardiovascular disease the registrant should return for detailed reexamination.*

Class 1-A.—*a. Normal heart. (A heart will be considered normal when the apex impulse is within the left midclavicular line and not below the fifth interspace; when sounds are normal and there are no thrills or important murmurs; when there is no abnormal pulsation or dullness above the base of the heart; when pulse rate is normal and regular and there is no unusual thickening of the arteries or evidence of high blood pressure.)* *b. A pulse rate of 100 or over which is not persistent. (A pulse rate of 100 or over may be temporary and due to excitement or to recent infection, such as pneumonia or local infections about the nose, mouth and throat, or may be induced by drugs.)* *c. A pulse rate of 50 or under which is proved to be the natural pulse rate of the registrant or to be temporary or due to the use of drugs.* *d. Sinus irregularity. (This consists in a quickening of the pulse rate during inspiration and a slowing during expiration and is best recognized with the registrant recumbent and breathing deeply.)* *e. Elevation of blood pressure from excitement, proved to be temporary.* *f. Neurocirculatory asthenia, if mild in degree.*

Class 1-B.—There are no cardiovascular criteria to warrant initial selection for class 1-B.

Class 4.—*a.* Circulatory failure evidenced by definite symptoms such as a combination of breathlessness, cyanosis and edema. *b.* Hypertrophy and dilatation of the heart evidenced by displacement of the apex impulse to the left of the mid-clavicular line or below the sixth rib, and of a heaving or diffuse character. *c.* A persistent heart rate of 100 or over when this is proved to be persistent in the recumbent posture and on observation and reexamination over a sufficient period of time. *d.* Paroxysmal tachycardia. *e.* Heart block. *f.* Any serious disturbance of rhythm, such as auricular fibrillation. *g.* Valvular disease. *h.* Congenital heart disease. *i.* Persistent blood pressure at rest above 150 mm. systolic or above 90 diastolic, unless in the opinion of the medical examiner the increased blood pressure is due to psychic reaction and not secondary to renal or other systemic disease. *j.* Thrombophlebitis of one or more extremities if there is a persistence of the thrombus or any evidence of obstruction of circulation in the involved vein or veins. *k.* Other abnormalities of the peripheral vascular system, including large varicose veins, Raynaud's disease, Buerger's disease (thrombo-angiitis obliterans), erythromelalgia, and arteriosclerosis of the leg vessels. In doubtful cases special tests should be employed. *l.* Aneurysm of any vessel. *m.* Pericarditis. *n.* Acute endocarditis. *o.* Angina pectoris clearly due to coronary insufficiency. *p.* Coronary thrombosis. *q.* Neurocirculatory asthenia (effort syndrome), unless mild.

Electrocardiogram.—The electrocardiogram is of great assistance in determining the nature of certain cardiac abnormalities, the most important of which are the various arrhythmias, defects in conduction, and diseases of the coronary arteries. The electrocardiograph may be utilized in cases in which such diagnostic aid is especially indicated but will not be employed as a routine measure.

X-Ray Examination.—In doubtful cases fluoroscopy is advised to determine the size and shape of the heart and great vessels. Such films as may be taken for the study of the lungs of the registrants should also be viewed for cardiovascular defects.

General Considerations.—*a.* It is incumbent on examining physicians (1) To accept for service men with accidental functional murmurs or other conditions which do not indicate disease and do not impair the individual's ability to undergo severe bodily exertion. (2) To exclude from active service in the Army any registrant affected with disease of the heart or blood vessels which impairs his ability to undergo severe bodily exertion. Although many men with compensated valvular heart disease are able to undergo severe bodily exertion, the question of aggravation in service, especially by activation of rheumatic carditis, is likely to arise and incidentally to create a pension problem. Therefore all registrants with valvular heart disease are to be regarded as unfit for service and will be placed in class 4. *b.* Men who desire to serve their country may from patriotic motives endeavor to conceal a known valvular lesion which has given no symptoms. On the other hand, men drafted for service may allege or feign symptoms to obtain exemption. Registrants may be expected to present physicians' certificates to substantiate the existence of valvular disease. Many of these may be given in good faith because of inadequate knowledge of the significance of certain frequent murmurs. Such certificates will not be accepted, but examining physicians will satisfy themselves by their personal examinations as to the physical qualifications of registrants. *c.* It is necessary, therefore, that the conclusions of the examining physician in doubtful cases will be based on objective evidence in the widest sense, including both physical signs, cardiac rhythm, measurement of blood pressure, and the observed effect of effort. Nevertheless, in the presence of questionable signs or symptoms, the history, especially of past rheumatic fever may be a factor in the final decision. No statement, however, will be accepted as proof of the existence of a cardiovascular defect unless supported by objective evidence. *d.* Since it is the duty of examining physicians to protect the interests of the government by preventing men from entering the service whose circulatory systems may be expected to break down under strain, and equally by pre-

venting the exemption or discharge of fit subjects because of unimportant deviations from the normal, it will be necessary for them to exercise care in the interpretation of their observations and to bear in mind constantly the murmurs and other departures from the supposed normal which may occur in perfectly healthy hearts.

Abdominal Organs and Wall

Class 1-A.—*a.* Normal abdominal organs and abdominal wall. *b.* Abdominal scars due to surgical operation or accident which show no hernial bulging. *c.* Scar pain when found not associated with any disturbance of function of abdominal wall or contained viscera, unless malingering is definitely excluded. *d.* Achylia gastrica, unless associated with a disqualifying disease. *e.* Complaint of weak stomach, indigestion, dyspepsia, constipation, belching, vomiting, and various other types and degrees of abdominal discomfort which are proved by examination not to be associated with organic disease, by the absence of the usual objective symptoms and signs and by such laboratory tests as may be employed, provided psychiatric examination reveals no disqualification. *f.* Blood in stools if proved to be due to slight defects, such as fissures of the anus, small hemorrhoids or superficial small ulcers of the rectum. *g.* Mild enlargement of the liver unassociated with other objective evidence of disease of the liver or other organs. *h.* Splenic enlargement of mild degree unassociated with evidence of other disqualifying disease. *i.* Small benign tumors of the abdominal wall. *j.* Intestinal parasites or their eggs in the stools. *k.* Internal and external hemorrhoids if mild in degree.

Class 1-B.—Unless the degree of disability is obviously disqualifying, *a.* Hernia-inguinal, femoral, umbilical and postoperative. *b.* Large benign tumors of the abdominal wall. *c.* Internal hemorrhoids moderately severe, if remediable.

Class 4.—Defects such as *a.* Inoperable hernia. *b.* Hydatids of the liver. *c.* Ulcer of the stomach or duodenum, if diagnosis is confirmed by the usual laboratory procedures. *d.* Obstruction of the bowel due to organic disease. *e.* Irremediable sinuses of the abdominal wall communicating with the hollow viscera. *f.* Irremediable stricture of the rectum. *g.* Multiple fistulas of the anus. *h.* Schistosomiasis. *i.* Enlargement of the spleen associated with leukemia, Hodgkin's disease or splenic anemia. *j.* Great enlargement of the spleen from any cause. *k.* Large internal and external hemorrhoids associated with prolapse of the rectum. *l.* Paralysis of the sphincter associated with incontinence of feces.

General Considerations.—*a.* When necessary to confirm a diagnosis, examining physicians should, when possible avail themselves of fluoroscopy and roentgenography when examining registrants. *b.* When examining physicians are able to command hospital facilities and the necessary diagnostic apparatus, they should, within their discretion, use test meals and chemical and microscopic examination of the stomach contents and stools. *c.* Examining physicians should make use of digital rectal examination of defects referable to that region, and, when necessary, proctoscopy should also be utilized. *d.* Registrants who are found to have parasites or their eggs in stools should have this condition indicated on report of examination. *e.* Moderate impulse produced by cough at the inguinal, femoral, or umbilical rings, or at the site of a scar is not necessarily indicative of hernia.

Genito-Urinary Organs and Venereal Diseases

Class 1-A.—*a.* Gonorrhea, acute or chronic. *b.* Syphilis with remediable manifestations except cerebrospinal, cardiovascular or visceral syphilis. *c.* Chancroids and the resulting infections of the lymph glands of the groin. *d.* Bed wetting, if mild in degree. *e.* Albuminuria with or without casts which is proved by observation and repeated examination to be temporary in character. *f.* Absence of one testicle due to removal or atrophy. *g.* Undescended testicle which lies within the abdominal cavity. *h.* Acute cystitis which has proved to be of a temporary character by observation and repeated examination over a period not to exceed six weeks. *i.* Phimosis with or without adhesions of the mucous surfaces, if remediable. *j.* Benign warts and other benign growths of the glans penis and of the prepuce. *k.* Amputation of the penis if a sufficient amount of the organ remains so as

not to interfere with the function of micturition. (Care should be taken to examine registrants fully for possible recurrence of a disqualifying disease for which the amputation was made.)
l. Varicocele of moderate size. *m.* Hydrocele of moderate size.

Class 1-B.—*a.* Stricture of the urethra, unless severe and irremediable. *b.* Benign tumor of the testicles. *c.* Cystitis, sub-acute or chronic, if deemed remediable. *d.* Varicocele if large. *e.* Hydrocele, if large and considered irremediable to a degree which would qualify for class 1-A but would permit limited service. *f.* Floating kidney. (By floating kidney is meant one which is freely movable.) *g.* Undescended testis which lies within the inguinal canal. *h.* Removal of one kidney, the remaining one being healthy. *i.* Bed wetting if more than mild in degree.

Class 4.—*a.* Chronic nephritis. This should be evidenced by the presence in the urine of albumin and casts, with or without blood, over a period of time sufficient to prove the persistence of the urinary condition. Examining physicians should require registrants to void the urine during the period of the examination and in their presence. When albumin and casts are found in the urine, the registrants should be reexamined not less than twice a day on two or more separate days. If the urine shows albumin and casts with or without blood, and this condition of the urine is associated with enlargement of the heart, high blood pressure and other evidences of cardiovascular disease, the diagnosis of chronic nephritis may be made immediately. If the presence in the urine of albumin and of casts with or without blood is proved to be inconstant, and if the condition is unassociated with the cardiovascular condition mentioned, decision should lie within the judgment and discretion of the examining physicians. *b.* Irremediable stricture of the urethra, unless of such slight degree as to be of no pathologic significance. *c.* Urinary fistula or incontinence. *d.* Gonorrheal arthritis which is of itself disqualifying. *e.* Surgical kidney with or without renal calculus. *f.* Irremediable pyelitis. *g.* Hydro-nephrosis or pyonephrosis. *h.* Tumors of the kidney or bladder. *i.* Acute nephritis if moderately severe and persistent after one month's observation. *j.* Chronic cystitis associated with calculi or with retention of urine caused by stricture of the urethra or by disease of the central nervous system. *k.* Amputation of the penis if the resulting stump is insufficient to permit of normal function of micturition. *l.* Hermaphroditism. *m.* Hypertrophy of the prostate gland of sufficient degree to cause retention of the urine. *n.* Epispadias or hypospadias when urine cannot be voided in such a manner as to avoid soiling of clothing or surroundings, or when accompanied by evidence of chronic infection of the genito-urinary tract. *o.* Cardiovascular, cerebrospinal and visceral syphilis.

General Considerations.—*a.* When it is deemed necessary, examining physician should employ x-ray facilities to verify diagnosis of defects of the genito-urinary organs. *b.* Complications and sequelae of gonorrhea will be regarded by examiners as acceptable or as disqualifying, depending on the degree of seriousness in individual cases, and registrants will be appropriately classified according to the best judgment of the medical examiners.

Endocrine and Metabolic Disorders

Class 1-A.—*a.* Goiter (enlargement of thyroid gland, diffuse or nodular) if unassociated with toxic or pressure symptoms, provided the enlargement of the thyroid will not interfere with the wearing of a uniform or military equipment. *b.* Froelich's syndrome, if very mild in degree. *c.* Hypothyroidism without myxedema, if not severe or resistant to cure. *d.* Acromegaly if not severe or associated with symptoms other than the bony changes. *e.* Pellagra, beriberi, scurvy and other nutritional deficiencies, if remediable by correction of diet and not severe. *f.* Glycosuria, if transient or renal in type, provided acceptance is deferred until the possible existence of diabetes mellitus is excluded.

Class 1-B.—Froelich's syndrome, if moderate in degree.

Class 4.—*a.* Toxic goiter or thyrotoxicosis. (It should be remembered that malingerers may by use of thyroid medication produce many of the symptoms of thyrotoxicosis.) *b.* Goiter with definite pressure symptoms or so large in size as to interfere with wearing a uniform or military equipment. *c.* Cretin-

ism with imbecility or dwarfism. *d.* Myxedema (with clinical manifestations, and diagnosis not based only on low basal metabolic rate). *e.* Gigantism or acromegaly if markedly disfiguring or if associated with other symptoms of severe pituitary dysfunction. *f.* Froelich's syndrome, if severe. *g.* Hyperparathyroidism and hypoparathyroidism, unless mild in degree. *h.* Addison's disease. *i.* Diabetes mellitus and diabetes insipidus. If sugar is found in the urine, further specimens should be voided in the presence of the physician or authorized assistant, and on more than one occasion to avoid the substitution of diabetic urine or the voiding of diabetic or dextrose containing urine previously introduced into the bladder by catheter. In doubtful cases the blood sugar should be determined. Before diabetes insipidus is diagnosed, malingering (by drinking a large quantity of water) should be excluded. *j.* Avitaminoses (including sprue, beriberi, pellagra and scurvy) which are severe or not readily remediable, or in which permanent pathologic changes have been established. *k.* Gout. *l.* Simmond's disease. *m.* Cushing's syndrome.

Diseases of the Blood and Blood-Forming Tissues

Class 1-A.—*a.* Secondary anemia, due to hemorrhoids or any other remediable cause. *b.* Purpura if symptomatic of a remediable condition. *c.* Sick cell anemia, if not severe. *d.* Malaria, acute or chronic, unless severe and irremediable.

Class 1-B.—Primary pernicious anemia in the absence of posterolateral sclerosis, if responsive to treatment and not severe.

Class 4.—*a.* Hemophilia. *b.* Thrombocytopenic purpura. *c.* Primary pernicious anemia if severe, not responsive to treatment or with neurologic complications. *d.* Aplastic anemia. *e.* Hemolytic ictero-anemia (hemolytic jaundice). *f.* Splenic anemia. *g.* Polycythemia vera. *h.* Leukemia, acute or chronic, of any type.

Mental and Nervous Disorders

Class 1-A.—*a.* A normal nervous system. *b.* Registrants who appear to have normal understanding, whose speech can be understood, who have no definite signs of organic disease of the brain, spinal cord or peripheral nerves, and who are otherwise mentally and physically fit. *c.* Muscular tremors of moderate degree, unless malingering is definitely excluded.

Class 1-B.—*a.* Stuttering and stammering of a degree disqualifying for general military service but which has not prevented registrants from successfully following a useful vocation in civil life. *b.* Tremors of such marked degree that they disqualify for general military service but have not prevented the registrants from following a useful vocation in civil life.

Class 4.—Any serious mental or neurologic disorder such as *a.* Insanity. *b.* Epilepsy. *c.* Postencephalitic syndrome. *d.* Imbecility. *e.* Drug addiction, including the habitual use of opium and its derivatives and cocaine. *f.* Chronic alcoholism. *g.* Stammering to such a degree that the registrant is unable to express himself clearly or to repeat commands. *h.* Psychoneuroses and constitutional psychopathic states, provided the diagnosis is clearly established and in the opinion of the medical examiner precludes the successful performance of military duty. *i.* Chronic essential chorea. *j.* Syphilis of central nervous system. *k.* Post-traumatic cerebral syndrome. *l.* Multiple sclerosis. *m.* Paraplegia or hemiplegia. *n.* Syringomyelia. *o.* Muscular atrophies and dystrophies which are obviously disqualifying. *p.* Hysterical paralysis. *q.* Neuritis or neuralgia which is not temporary in character and which has progressed to such a degree as to prevent the registrants from following a useful vocation in civil life. *r.* Brain tumors. *s.* Cerebral arteriosclerosis. *t.* Sexual perversion.

Diagnostic Criteria.—In arriving at decisions concerning nervous or mental defects, the following criteria may be of assistance: *a.* Insanity.—All registrants should be considered insane who are committed, or who have been committed, to a licensed public institution for the care of the insane. The examining physicians may require proof in the form of verified records of commitment by the proper state authorities to verify the statements of the registrants. (1) *Dementia Praecox.*—Look for indifference, apathy, withdrawal from environment, ideas of reference and persecution, feelings of the mind being tampered with, or thought being controlled by hypnotic, spiritualistic or

other mysterious agencies, hallucinations of hearing, bodily hallucinations, frequently of electrical or sexual character; meaningless smiles; in general, inappropriate emotional reactions and lack of connectedness in conversation. There may be sudden emotional or motor outbursts. The history of family life and of school, vocational and personal career will usually show erratic and more or less irrational conduct. (2) *Manic-Depressive Insanity*.—Look for mild depression, with or without feeling of inadequacy, or mild manic state with exhilaration, talkativeness and overactivity. (3) *Paresis*.—The diagnosis of paresis may be made when at the examination of the registrant a majority of the following signs and symptoms are demonstrated: Argyll Robertson pupil, facial tremor, speech defect in test phrases and in the slurring and distortion of words in conversation; writing defects, consisting of omissions and the distortion of words; apathetic or depressed or euphoric mood. These registrants may show memory loss or discrepancies in relating facts of life; the knee jerks may be plus, minus or normal. *b. Epilepsy*.—The registrant will not be considered epileptic unless the claim is substantiated by characteristic scars on the tongue, face or head or, if the examining physician is in doubt, by properly certified proof. *c. Imbecility*.—A registrant will be declared an imbecile who has been so defective in mind from birth or early age as to be incapable of earning a livelihood but at the same time is able to guard himself against common physical danger. *d. Chronic Alcoholism*.—(1) A registrant will be declared a sufferer from chronic alcoholism when he presents a majority of the following symptoms and signs: suffused eyes; prominent superficial blood vessels of nose and cheek; flabby, bloated face; red or pale purplish discoloration of mucous membrane of the pharynx and soft palate; muscular tremor of the protruded tongue and extended fingers; tremulous handwriting. (2) The history of evidence presented that the registrant has been frequently and grossly intoxicated is not of itself sufficient proof for the diagnosis of chronic alcoholism. *e. Tabes*.—The diagnosis of this disease should be made when, at the examination of the registrant, several of the following signs and symptoms are present: Argyll Robertson pupil; absent knee jerks; positive Romberg, ataxic gait (especially when the eyes are closed); hypotonia, and anesthetic areas of the skin. The history of tabes is usually that of slow progression, of failing sexual power, and pains in the legs or back which are often described as rheumatism. *f. Cerebrospinal Syphilis*.—The prominent diagnostic signs and symptoms are headaches, varying deep and superficial reflexes, pupillary changes, ptosis, ocular palsies, facial weakness; the mental state may be normal, dull or apathetic. Comparative motor weakness may involve one side of the body or one extremity. *g. Multiple Sclerosis*.—The diagnosis of this disease rests on the following signs and symptoms: intention tremor, nystagmus, absent abdominal reflexes, increased tendon reflexes, and scanning speech; in cases of this kind the history obtained is not characteristic, but sometimes there may be a history of urinary disturbances. *h. Paraplegia*.—The diagnosis of paraplegia from whatever cause will rest on weakness of the lower extremities, associated with loss of or increased knee jerks, Babinski reflex or disturbance of the sphincters of the rectum and bladder, with or without girdle sensations. Sensory disturbance of the skin may or may not be present. Muscle sensibility may be diminished. *i. Syringomyelia*.—Syringomyelia is usually evidenced by more or less loss of power and atrophy of groups of muscles of one or more extremities; disturbance of the sensations of the skin, more especially in the form of analgesias, and diminution of the temperature sense; if in the upper dorsal cord, often associated with stooped shoulder posture; if in the lower dorsal, with weakness in one or both lower extremities. *j. Muscular Atrophies and Dystrophies*.—The signs and symptoms of muscular atrophies and dystrophies are atrophies of the small muscles of the hand and of the muscle groups of the shoulder; fibrillary twitchings. The history of these defects rarely furnishes reliable data, although it will usually be found that the registrant has shown evidences of awkwardness. There is never a history of pain in the affected muscles. *k. Multiple Neuritis*.—The chief manifestations are more or less pain in the course of the affected nerves, with tenderness over the trunks of the nerves and of the muscles supplied by them; lessened muscular power of varying degrees;

more or less atrophy of muscles, with or without contraction, and evidences of trophic changes of the skin. The reflexes, deep and superficial, may be diminished or absent; the sphincters are not involved.

Sequelae of Organic Neurologic Disease.—Certain after-effects of organic nervous disease need not be causes for rejection, provided *a.* The disease is no longer active and is not likely to recur. *b.* The effect left by it does not prevent a satisfactory fulfillment of military duties. Examples of such conditions are paralysis of a few unimportant muscles following poliomyelitis, slight unilateral hypertonicity as a result of an infantile hemiplegia in a man now robust, and various traumatic conditions.

Purposely Caused Physical Defects

Report of Apparently Purposely Caused Defects.—Whenever it shall appear to an examining physician that a registrant is suffering from self-inflicted or purposely caused physical defects which, under the standards of physical examination prescribed herein, would render him disqualified for military service of any kind, a full statement of the facts and of the condition of the registrant and of the examining physician's recommendation will be prepared and submitted to the Director of Selective Service or other designated authority for a waiver of the physical defects, if recommended, so that the registrant may be compelled to render military service.

Notes on Malingering

Types of Malingerers.—Maleringers may be divided into three general groups: *a.* Real malingerers with nothing the matter with them, who injure themselves, or make allegations respecting diseases or such condition as drug taking, or who simulate disease with full consciousness and responsibility—all for the purpose of evading military service. Many of these will have been coached. *b.* The psychoneurotic, who are natural complainers and try to get out of every disagreeable thing in life; perhaps only partially conscious of the nature of the seriousness of what they do and only partly responsible. In many the motives are not persistent and many can be made into good soldiers. *c.* Confirmed psychoneurotic individuals with long history of nervous breakdowns and illnesses who behave like group *a* above but more persistently and from whom not much can be expected in the way of reconstruction.

Feigned Medical Diseases.—*a.* The detection and management of malingerers simulating medical diseases depend on the absence of positive signs in an individual who presents the general characteristics of the malingerer. There is especial need for the physical examination to be thorough in this group. Some of the cardiac cases at first regarded as malingering may later be found to be mitral stenosis or bacterial endocarditis. Similarly, proper tests may show the existence of peptic ulcers in those suspected of feigning digestive abnormalities. The estimation of the reality of rheumatic pains is always a difficult matter. *b.* Tachycardia and thyrotoxicosis may be temporarily induced by ingestion of drugs, such as thyroid extract. Egg albumin or sugar may be added to urine. Undiluted canned milk may be made to simulate the urethral discharge. Cantharides may be taken to cause albuminuria. Digitalis and strophanthus may be taken to cause abnormal heart action. The skin may be irritated by various substances. Cathartics may be taken to bring about purging or to simulate a chronic diarrhea. An appearance of hemoptysis may be produced by adding blood, either human or that of animals, to the sputum. Sometimes merely coloring matter is added. Those who can vomit voluntarily what they swallow use the same means to create the appearance of hematemesis. Similarly, coloring matter may be added to the stools. Mechanical and chemical irritants are made use of to cause inflammation about practically all the body orifices. Jaundice may be simulated by taking picric acid. Crutches, spectacles, trusses and strappings are made use of to create the appearance of disability. Artificial jaundice is recognized by demonstration of picric acid in the urine.

Feigned Surgical Conditions.—Under this are included old scars and injuries of the bones, fractures and orthopedic conditions. Men may have teeth extracted in an effort to evade military service. Others may shoot or cut off their fingers or toes, practically always on the right side, to disqualify

themselves for service. Some may put their hands under cars for this purpose. Retention of urine may be simulated. Substances may be injected under the skin to create abscesses. Crutches, braces, strappings or trusses may be used to give the appearance of disability. Wounds are rarely self inflicted when witnesses are present; consequently it is almost impossible to be certain of malingering in some cases.

Nervous and Mental Feigned Illness.—*a. Insanity.*—Rarely feigned by registrants and then of an extremely silly, foolish type. In case of doubt, hospital observation is necessary, with verified past records. Mental defects are frequently feigned, especially by illiterates. Organic diseases of the central nervous system cannot be simulated. *b. Pain and Hyperesthesia.*—The most frequent of all complaints. History inconsistent, ordinary traces of suffering absent. Absence of other symptoms usually accompanies types of pain complained of. Absence of objective evidence of localized pains. Note behavior when the registrant believes himself unobserved. *c. Anesthesia.*—Complaint of anesthesia itself creates a suspicion of malingering, as most patients with anesthesia are ignorant of it. *d. Epilepsy.*—Men who have sustained head injury are very apt to claim fits. These complaints may be in reference to grand mal or petit mal. Petit mal attacks are spoken of as fainting attacks. In grand mal attacks there is loss of pupil response to light, knee jerks are lost, and the Babinski reflex may be present. *e. Hysteria.*—Not feigned in itself, but its existence creates confusion as to malingering. The question to be decided is whether the registrant is too seriously affected with the neurosis to be useful as a soldier. *f. Stiff Back.*—Stiff back is a frequent symptom of hysteria in mobilization among selected men. In cases of this kind, organic diseases of the vertebrae can and should be excluded, if necessary, by x-ray examination.

Bed Wetting.—Enuresis, either real or simulated, may be a frequent complaint among registrants for military service, but it is not a cause for unconditional rejection. Bed wetters may be placed in class 1-A or 1-B depending on the apparent significance or severity of the disorder.

General Considerations.—*a.* The surest means of detecting malingering is a thorough understanding by the examining physician of the types of people who actually do it, and the way they behave. It is only in the feigned diseases of the eye and ear that special tests are required. Observation in hospital is necessary in difficult cases. The vast bulk of malingerers are those who exaggerate some actual defect, and the problem for the examining physician is to decide whether the defect complained of is sufficient cause for rejection for service. Persons of intelligence and education have more difficulty in deceiving, as they are bound to express themselves freely. If they are reticent in these matters they arouse suspicion by their reticence. Those who talk freely may be counted on to say things at variance with the existence of the disease of which they complain. *b.* Whenever it shall appear to an examining physician that a registrant is endeavoring to escape service by malingering, if otherwise mentally and physically fit, he will be accepted. A full statement of the facts will be prepared and forwarded to the Director of Selective Service.

NEW YORK MEETING ON MILITARY MEDICINE

The Second District Branch of the Medical Society of the State of New York will hold its thirty-fourth annual meeting at Mitchel Field, Garden City, November 13. The theme of the meeting will be Military Medicine. Among the speakers will be:

Dr. Samuel J. Kopetzky, New York, Plans of the Medical Profession for National Preparedness and Mobilization.
Col. Julius Blank, medical corps, U. S. Army, Second Corps Area, General Principles of Medicomilitary Care and Evacuation.

Dr. Clarence R. Straatsma, New York, Plastic Surgery in Connection with General Medical Work.

Lieut. Col. Martin F. DuFrenne, medical corps, U. S. Army, Fort Jay, Governors Island, Treatment of Head Injuries.

Col. Floyd Kramer, medical corps, U. S. Army, Fort Totten, Flushing, Hospitalization in the Zone of the Interior and in the Theater of Operations.
Dr. Virgil H. Moon, Philadelphia, Practical Phases of the Early Recognition and Management of Shock.
Lieut. Col. Charles L. Maxwell, medical corps, U. S. Army, Mitchel Field, Aviation Medicine.

Addresses will be given by Col. Douglas B. Netherwood, air corps, commanding officer, Mitchel Field, and Dr. James M. Flynn, Rochester, president of the state medical society. A program has also been planned for the local woman's auxiliaries.

Organization Section

OFFICIAL NOTES

ADDRESSES BY OFFICIAL STAFF

DR. PAUL C. BARTON:

Nov. 26—Chicago Woman's Aid, Chicago.

DR. W. W. BAUER:

Nov. 6—Yale University School of Medicine, New Haven, Conn.

Nov. 8—New England Superintendents Association, Boston.

Nov. 8—Harvard School of Public Health, Boston.

Nov. 12—Englewood Evening School, Chicago.

Nov. 13—Cleveland Health Museum, Cleveland.

Nov. 18—Boone County Medical Society, Woman's Auxiliary, Jefferson City, Mo.

Nov. 18—Boone County Medical Society, Columbia, Mo.

Nov. 19-20—Stephens College, Columbia, Mo.

Nov. 26—Irving Park Branch, Chicago Medical Society, Woman's Auxiliary, Chicago.

Dec. 6-7—National Education Association, Yearbook Committee, Pittsburgh.

DR. MORRIS FISHBEIN:

Nov. 6—Woman's Auxiliary to North Side Branch Chicago Medical Society, A. M. A. Headquarters.

Nov. 8—Radio Broadcast, National Foundation for Infantile Paralysis, Inc., New York.

Nov. 12—Englewood Branch Chicago Medical Society, Chicago.

Nov. 14—American Conference on Industrial Health, Chicago.

Nov. 24—Joliet Sunday Evening Club, Joliet, Ill.

Dec. 4—Ingham County Tuberculosis Society and Ingham County Medical Society, Lansing, Mich.

Dec. 4—Town Hall, Lansing, Mich.

DR. FRANK H. LAHEY:

Nov. 1—Duke University School of Medicine, Durham, N. C.

Nov. 7—House Officers Association, Boston City Hospital, Boston.

Nov. 7—Brockton Medical Society, Toll House, Whitman, Mass.

Nov. 14—Geneva Academy of Medicine, Geneva, N. Y.

Nov. 18—Massachusetts Hospital Association, Parker House, Boston.

DR. PAUL A. TESCHNER:

Nov. 14—Longfellow School Parent Teacher Association, Oak Park, Ill.

Nov. 19—Roosevelt School Parent Teacher Association, Elmhurst, Ill.

Nov. 25—North Central College, Naperville, Ill.

Dec. 2—Woman's Club, Chilton, Wis.

Dec. 4, 5, 6—Fourth School Broadcast Conference, Chicago.

DR. NATHAN B. VAN ETEN:

Nov. 13—Southern Medical Association, Louisville, Ky.

Nov. 19—Westchester County Medical Society, White Plains, N. Y.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

ALABAMA

Examination for Director of Jefferson Hospital.—Applications are now being received to fill the position of director of Jefferson Hospital, Birmingham. An announcement appeared in *THE JOURNAL*, October 19, page 1385, outlining the qualifications, but a later notice states that the age limit has been eliminated from the requirements, although the applicant must be not less than 32 years of age. The stipulation that previous experience shall have been in a hospital of at least 150 beds has also been eliminated, but the applicant must have had not less than five years' experience as administrator of an approved general hospital caring for both private and charity patients. The closing date for applications has been extended from October 25 to November 10. Information may be secured from the Personnel Board of Jefferson County, Room 520, Courthouse, Birmingham, or from Dr. William H. Walsh, consultant to the board, 612 North Michigan Avenue, Chicago.

CALIFORNIA

Society News.—Dr. Dwight L. Wilbur, San Francisco, addressed the Los Angeles County Medical Association, October 17, on "Clinical Importance of the Vitamin B Complex."—The Los Angeles Society of Neurology and Psychiatry was addressed, October 16, by Drs. Norman Reider on "Influence of Early Training on Later Aphasic Manifestations" and Johannes M. Nielsen, "The Associative Function of the Minor Cerebral Hemisphere."—Among others, Dr. Victor Goodhill discussed "Fracture of the Larynx" before the Los Angeles Society of Ophthalmology and Otolaryngology, October 28.—A symposium on office gynecology was presented before the Alameda County Medical Association, Oakland, October 21, by Drs. Leonard Woods, John N. Ewer, John W. Sherrick and Thomas Floyd Bell, all of Oakland, and Woodburn K. Lamb, Berkeley.

COLORADO

The Friedman Lectures.—The William S. Friedman Lectures will be delivered, November 4-5, under the auspices of the National Jewish Hospital, Denver, in cooperation with the Medical Society of the City and County of Denver and the University of Colorado School of Medicine. The lecturers will be Drs. Edgar Mayer, assistant professor of clinical medicine, Cornell University Medical College, New York, and Oswald S. Lowsley, director, department of urology, James Buchanan Brady Foundation, New York. Dr. Mayer will speak on "Recent Advances in the Clinical Interpretation and Management of Pulmonary Tuberculosis" and "Pulmonary Tuberculosis in the Present Epidemiologic Phase" and Dr. Lowsley on "Surgical and Nonsurgical Treatment of Tuberculosis of the Genital and Urinary Tracts" and "Prostatic Surgery." Both physicians will conduct clinics. The lectures are financed by the Friedman Fund, which was established in 1938.

ILLINOIS

Southern Illinois Meeting.—The sixty-sixth annual meeting of the Southern Illinois Medical Association will be held in the high school gymnasium, Metropolis, November 14. Included among the out of town speakers will be:

Dr. Clyde E. Purcell, Paducah, Ky., Bronchoscopy.
Dr. Russell J. Blattner, St. Louis, Infant Feeding.
Dr. Gershon J. Thompson, Rochester, Minn., Prostatic Problems.
Dr. Adolph H. Conrad, St. Louis, Dermatology in General Practice.
Dr. William T. Pride, Memphis, Tenn., Anesthesia, Analgesia and Amnesia in Obstetrics.
Dr. Samuel B. Grant, St. Louis, Modern Care and Treatment of Pneumonia.
Dr. James S. Speed, Memphis, Tenn., Care of Commoner Fractures Encountered in General Practice.

Postgraduate Conference at Mattoon.—The Illinois State Medical Society is sponsoring a postgraduate course in Mattoon, November 7, with the Coles-Cumberland County Medical Society acting as host. The speakers will be:

Dr. Italo F. Volini, Chicago, Sulfanilamide and Allied Drugs; Indications, Contraindications, Dosage.

Dr. William C. Danforth, Evanston, Ill., Misguided Gynecologic Operations and the Consequences.
Dr. Willard O. Thompson, Chicago, Obesity, Types and Management.
Dr. Millard F. Arbuckle, St. Louis, Late Developments in Upper Respiratory Diseases.
Dr. Louis R. Limarzi, Chicago, Recent Advances and Treatment of Abnormal Blood Conditions.
Dr. Eugene F. Traut, Chicago, Chronic Arthritis, Medical Management.
Dr. John S. Coulter, Chicago, Chronic Arthritis, Management with Physical Therapy.

A symposium on diseases of the biliary tract will be presented in the evening by Drs. Manuel E. Lichtenstein and Karl A. Meyer, both of Chicago.

A conference was conducted in Bloomington, October 31, with the McLean County Medical Society acting as host and with the following speakers on the program:

Dr. James E. Graham, Springfield, Varicose Veins.
Dr. Wilber E. Post, Chicago, Arthritis.
Dr. Bert I. Beverly, Chicago, General Principles of Behavior in Children.
Dr. Henry Close Hesselstine, Chicago, Newer Endocrines in Gynecology.
Dr. Ralph A. Reis, Chicago, Spontaneous Abortions.

A symposium on the gallbladder and liver, with Drs. Andrew C. Ivy and Harry M. Richter, Chicago, as the speakers, concluded the session.

Chicago

Personal.—The Sisters of St. Anthony de Padua Hospital gave a dinner, October 9, in honor of four physicians who have given the hospital more than thirty-five years' continuous service. The physicians are Drs. Stephen E. Donlon and Max A. Weisskopf, who have been members of the staff since its foundation in 1896, and Drs. John D. McGregor and Fred J. E. Ehrmann.

Meeting on Chemotherapy.—Dr. John A. Kolmer, Philadelphia, will address the Chicago Medical Society, November 6, on "The Present Status of Chemotherapy." Discussions of "The Application of Chemotherapy in Medicine" will be presented by Drs. Robert W. Keeton, internal medicine; Warren H. Cole, surgery; Russell D. Herrold, urology; Ralph A. Reis, obstetrics, and Franklin J. Corper, pediatrics.

Society News.—The Chicago Orthopaedic Society was addressed, October 17, by Drs. Francis Walter Carruthers, Little Rock, Ark., on "Treatment of Fractures of Long Bones by a Removable Screw" and James S. Speed, Memphis, Tenn., "Treatment of Fractures Near Joints."—The Chicago Gynecological Society was addressed, October 18, by Drs. John H. Moore, Grand Forks, N. D., on "Late Effects of the Toxemias of Pregnancy" and Edwin C. Hamblen, Durham, N. C., "Observations on the Gynecic Employment of Equine Gonadotropins."—The Chicago Surgical Society was addressed, November 1, by Drs. Stephen A. Zieman on "Fibrosarcoma of the Soft Part of the Finger: Case Report"; Paul B. Magnuson, "Joint Débridement: Surgical Treatment of Certain Types of Arthritis," and Geza de Takats, "Surgical Approach to Hypertension."—Dr. John D. Ellis will discuss "Lesions of the Back Mistaken for Trauma" before the Chicago Society of Industrial Medicine and Surgery, November 4, and Dr. Frederick A. Jostes, St. Louis, "Evaluation of Manipulative Therapy for Back Conditions."—The Chicago Laryngological and Otolological Society will be addressed, November 4, by Drs. William E. Grove and Gerhard D. Straus, both of Milwaukee, on "Otitis Media—Meningitis—Labyrinthitis—Recovery with Retention of Function Through Chemotherapy Plus Radical Exposure Without Labyrinthectomy"; John R. Lindsay, "Chemotherapy in the Treatment of Otic Complications," and Paul A. Campbell, "A Few Medical Problems of Combat Aviation."—The Illinois Psychiatric Society will be addressed, November 7, by Drs. Abraham A. Low and Elizabeth P. MacDougall on "Combined Picrotoxin and Metrazol Treatment of Mental Patients"; Victor E. Gonda, "Treatment of Mental Disorders with Electrically Induced Convulsions," and Gerhart Pisk, Elgin, Ill., "Prognostic Observations in Insulin Treatment of Schizophrenia."

INDIANA

Graduate Course in Obstetrics.—The Tippecanoe County Medical Society, in cooperation with the state bureau of maternal and child health, will offer a postgraduate course in obstetrics at the Home Hospital, Lafayette, beginning November 7. The second meeting will be November 14, the third November 28 and the last December 5.

Dr. Ferree Named Director of Health.—Dr. John W. Ferree, since 1936 chief of the bureau of local health administration, state department of public health, has been appointed director of public health, succeeding Dr. Verne K. Harvey, resigned. Dr. Ferree graduated at Indiana University School

of Medicine, Indianapolis, in 1932. He also has a degree in public health from Johns Hopkins University School of Hygiene and Public Health.

Dr. Huber Wins Obstetricians' Prize.—Dr. Carl P. Huber, associate professor of obstetrics, Indiana University School of Medicine, Indianapolis, has received the 1940 award of the Central Association of Obstetricians and Gynecologists for the best clinical essay. The title of the paper, which was prepared with the assistance of Dr. Jack C. Shrader, 1940 graduate of the medical school and now an intern in the Indianapolis City Hospital, was "Blood Prothrombin Levels in the Newborn." Dr. Huber graduated at the University of Michigan Medical School, Ann Arbor, in 1928, where he served in the department of obstetrics and gynecology until 1936. He spent the following two years at the Chicago Lying-in Hospital and joined the faculty of Indiana University in 1938. Dr. Shrader received the Ravdin gold medal awarded to the student ranking highest scholastically in his class at the June commencement.

MAINE

Society News.—The Androscoggin County Medical Society was addressed, September 19, by Drs. Morris E. Goldman, Lewiston, on "Fractures of the Bones About the Hand" and Edwin Kay, Lewiston, "Placenta Praevia."—Among others, Dr. Duncan E. Reid, Boston, addressed the Kennebec County Medical Association, Gardiner, September 19, on "Use of X-Rays in Obstetrics."—Dr. Frederick T. Hill, Waterville, discussed "Chemotherapy in Relation to Otolaryngology" before the Piscataquis County Medical Association, September 19.

MINNESOTA

Mayo Memorial Proposed.—The Mayo Memorial Commission has been appointed by Gov. Harold E. Stassen to study a proposal for the establishment of a \$250,000 fund through public subscription throughout the world for a memorial to the late Drs. William J. and Charles H. Mayo. State Senator William B. Richardson, Rochester, is chairman of the commission, which is composed of seventeen representative citizens of Minnesota.

Society News.—The Minneapolis Clinical Club was addressed, October 10, by Drs. Carl W. Laymon on "Kodachrome Photography in Dermatology"; Harry W. Christian, "Factitious Proctitis Caused by Irradiation" and "Value of Macroscopic and Microscopic Examination of Excised Rectal and Anal Tissue," and James M. Hayes, "Gastro-Enterostomy" (a motion picture).—Dr. Wesley W. Spink addressed the Minnesota Pathological Society, October 15, in Minneapolis on "Pathogenesis and Treatment of Staphylococcal Infections."—The Wabasha County Medical Society was addressed in Plainview, October 10, by Drs. Earl W. Ellis, Elgin, on "Duties of Physicians in Relation to Medical Preparedness" and "Report of a Case of Ruptured Gastric Ulcer in a Diabetic Patient"; Floyd M. Feldman, Rochester, "Review of Knowledge Concerning Acute Poliomyelitis"; Clarence G. Ochsner, Wabasha, "Report on Appendectomies," and Miland E. Knapp, Minneapolis, "Physical Therapy in General Practice."

NEW JERSEY

New York University Sponsors Courses in Newark.—New York University College of Medicine is offering two postgraduate courses at the Newark City Hospital during 1940-1941. The first, which will begin November 6 and continue through December 4 on Wednesday and Friday afternoons, will be on peripheral vascular diseases. The work will be directed by Dr. Stuart Z. Hawkes, Newark. The second course will be on fractures, under the direction of Dr. Herbert A. Schulte, Newark, and will cover nine weeks, from February 5 to April 2, on Wednesday mornings. Applications should be sent to the Office of the Dean, New York University College of Medicine, 477 First Avenue, New York.

Society News.—Dr. John Carlisle Brown, Atlantic City, addressed the Medical Society of Cape May County at Cape May Court House, October 8, on "Toxemias of Pregnancy."—Dr. William E. Caldwell, New York, addressed the Essex County Medical Society, Newark, October 10, on "Prolonged First Stages of Labor."—Dr. Henry H. Ritter, New York, addressed the Atlantic County Medical Society, Atlantic City, October 18, on "What the General Practitioner Should Know About the Surgery of Trauma."—Dr. Jay Arthur Myers, Minneapolis, addressed the Bergen County Medical Society at

Bergen Pines, October 8, on "Follow-Up Work in Tuberculin Testing Surveys."—Dr. Chevalier L. Jackson, Philadelphia, addressed the Camden County Medical Society, Camden, October 1, on "Broncho-Esophagology in Relation to General Medicine."

NEW YORK

District Meetings.—The Fourth District Branch of the Medical Society of the State of New York held its annual meeting in Schenectady, October 1-2, with the following speakers, among others:

Dr. Abraham H. Aaron, Buffalo, Proprietary Medicines.
Dr. John E. Deitrick, New York, Acute Cardiovascular Emergencies.
Dr. Louis H. Bauer, Hempstead, Medical Care of the Indigent Sick.
Dr. Frederick F. McGauley, Schenectady, Treatment of Unusual Fractures.

The Eighth District Branch held its meeting at Niagara Falls, October 3, with the following speakers:

Dr. Noah Stanley Lincoln, Mount Morris, Diagnosis and Management of Early Pulmonary Tuberculosis.
Dr. Julius H. Hess, Chicago, Problems in the Care of the Premature Infant.
Dr. William P. Van Wagenen, Rochester, The Rationale of Common Procedures Used in the Care of Head Injuries.

Dr. Abraham H. Aaron, Buffalo, led a round table discussion on therapy, and there was also a program of motion pictures.

New York City

First Harvey Lecture.—Dr. Charles Armstrong, senior surgeon, U. S. Public Health Service, National Institute of Health, Washington, D. C., delivered the first Harvey Lecture of the season, October 31, at the New York Academy of Medicine. His subject was "Studies on Lymphocytic Choriomeningitis and Poliomyelitis."

Annual Hospital Fund Campaign.—The United Hospital Fund opened its sixty-second annual city-wide campaign, October 21, with a dinner at the Hotel Astor. Roy E. Larsen, president of Time Inc. and publisher of *Life*, is general chairman of the campaign, in which about 5,000 volunteer workers, representing eighty-nine voluntary hospitals, women's social service committees and auxiliaries and the Visiting Nurse Association of Brooklyn will participate.

The Salmon Lectures.—The eighth series of Thomas William Salmon Lectures will be delivered by Dr. Nolan D. C. Lewis, director of the New York State Psychiatric Institute and professor of psychiatry at Columbia University College of Physicians and Surgeons, on three successive Friday evenings at the New York Academy of Medicine. Dr. Lewis's general subject will be "The Pathway of Research in Psychiatry," and the individual lectures will be as follows:

November 8, Historical Perspectives of Psychiatric Thought.
November 15, Modern Ramifications in Psychiatric Thought.
November 22, Prospects for Future Achievement in Psychiatric Research.

Society News.—Drs. Edgar van Nuys Allen, Rochester, Minn., and Loyal Davis, Chicago, addressed a stated meeting of the New York Academy of Medicine, October 3, on medical and surgical aspects, respectively, of "Arterial Hypertension."—Dr. David I. Bassett addressed the Bronx Otolaryngological Society, September 24, on "Otitic Hydrocephalus."—Dr. Harvey B. Matthews, Brooklyn, discussed "Obstetric Shock" in a Friday afternoon lecture of the Medical Society of the County of Queens, October 4.—Dr. William Bierman, among others, addressed the New York Physical Therapy Society, October 9, on "Use of Physically Induced Pyrexia and Chemotherapy in Treatment of Subacute Bacterial Endocarditis."—Dr. Russel H. Patterson addressed the New York Surgical Society, October 9, on "Lymphogranuloma of the Rectum."—Drs. Louis E. Phaneuf, Boston, and Edward A. Schumann, Philadelphia, addressed the Medical Society of the County of Kings, Brooklyn, October 15, on "Cesarean Section" and "Certain Complications in Labor" respectively.

NORTH CAROLINA

Personal.—Dr. Allen J. Jervey Jr., Tryon, has been appointed district health officer for Rutherford and Polk counties to succeed Dr. Harold C. Whims, Rutherfordton, who was recently transferred to the Lincoln-Catawba district.

NORTH DAKOTA

Appointments to State Board.—Drs. Willard A. Wright, Williston, and Archibald D. McCannel, Minot, have been appointed to the state board of medical examiners to succeed Drs. William C. Fawcett, Starkweather, and Jesse W. Bowen, Dickinson. Dr. William A. Gerrish, Jamestown, was reappointed.

OHIO

Annual Institute on Cardiovascular Disease.—The Academy of Medicine of Cincinnati and the Heart Council of Cincinnati will present the seventh Cardiovascular Institute, November 12, on "Congestive Heart Failure." Clinical programs will be held at the Cincinnati General Hospital and the Children's Convalescent Home, the annual dinner of the Heart Council at the University Club and an evening meeting at the Academy of Medicine, with Dr. Tinsley R. Harrison, Nashville, Tenn., as the guest speaker.

Postgraduate Program.—The Summit County Medical Society presented its ninth annual Postgraduate Day, October 23, in Akron. The speakers, all of the faculty of the University of Michigan Medical School, Ann Arbor, were:

- Dr. Cyrus C. Sturgis, The Menace of Obesity, and The Diagnosis and Treatment of the So-Called Secondary Anemias.
Dr. John Alexander, Intrathoracic Tumors, and the Management of Bronchiectasis.
Dr. Walter G. Maddock, Problems in Severe Hyperthyroidism.
Dr. John M. Sheldon, Evaluation of Modern Drugs in Management of Allergic Patients, and the Diagnosis and Management of Eczema Patients.

PENNSYLVANIA

Warning of Impostor.—A man purporting to represent a firm called Hogan & Hogan at Germantown has been traveling through Pennsylvania taking orders for physicians' supplies, such as gauze, bandages and adhesive. Investigation by the Post Office at Germantown revealed that there is no such firm in the town, a Pennsylvania physician reports.

Memorial to Dr. Jesse Lazear.—Washington and Jefferson College, Washington, dedicated a new \$100,000 chemistry building, October 26, to the memory of Dr. Jesse W. Lazear, who died in Cuba in 1900 of yellow fever while serving as a member of the Yellow Fever Commission of the U. S. Army. Dr. Lazear was an alumnus of the college. John R. Kissinger, Huntington, Ind., and John J. Moran, Habana, Cuba, two of the group of soldiers who allowed themselves to be bitten by mosquitoes during the investigation, were guests at the dedication ceremonies. The college drama club presented Sidney Howard's play "Yellow Jack" as part of the ceremonies, which were held on the college's Founders' Day. At a banquet in the evening Dr. Philip S. Hench, Rochester, Minn., made an address on the work of the Yellow Fever Commission. The Jesse W. Lazear Chemistry Hall is one of three buildings dedicated, including one in honor of Edwin Linton, Ph.D., for many years professor of biology and geology at Washington and Jefferson and one of the founders of the Marine Biological Laboratory at Woods Hole, Mass.

Philadelphia

Annual Dinner of Ex-Residents.—The fifty-fourth annual dinner of the Association of Ex-Resident and Resident Physicians of the Philadelphia General Hospital will be held Tuesday, December 3, at the Midway Club, with Major Gen. Charles R. Reynolds, retired, director of the division of tuberculosis in the state department of health, as the guest of honor. Ex-residents who do not receive notices are requested to send their correct addresses to the secretary, Dr. George S. Wilson, 133 South Thirty-Sixth Street, Philadelphia.

Society News.—Dr. Joseph Stokes Jr. addressed the Philadelphia Pediatric Society, October 8, on "Clinical and Nutritional Problems Arising in Unoccupied France." Dr. Stokes recently spent several weeks in the area.—Drs. William T. Read Jr., Camden, N. J., and Leonard P. Lang, among others, addressed the Pathological Society of Philadelphia, October 10, on "Acutely Progressive Hodgkin's Disease" and "Tuberculosis of the Adrenal Simulating Thyroid Crisis" respectively.—Speakers before the Philadelphia Psychiatric Society, October 11, included Drs. Matthew T. Moore, Nathaniel W. Winkelman and Leon Solis-Cohen on "Asymptomatic Vertebral Fractures in Epilepsy."

RHODE ISLAND

Annual Clinic at Pawtucket.—The annual Intern Alumni Clinic Day will be held at Memorial Hospital, Pawtucket, November 6. Members of the staff will conduct clinics and the following members of the staff of Memorial Hospital for the Study of Cancer and Allied Diseases, New York, will give addresses: Drs. Hayes E. Martin on "Diagnosis and Treatment of Cancer of the Head and Neck"; Norman Treves, "Diagnosis and Treatment of Cancer of the Breast," and George T. Pack, "Diagnosis and Treatment of Cancer of the Gastrointestinal Tract."

WASHINGTON

State Obstetric Meeting.—Dr. Howard C. Stearns, Portland, Ore., was the guest speaker at the fall meeting of the Washington State Obstetrical Association at Spokane, October 5. At the morning session there were panel discussions of obstetric hemorrhage and in the afternoon reports of unusual cases were presented. Dr. Stearns conducted a round table discussion of antepartum care and presented two addresses on "Abruptio Placentae and Placenta Praevia" and "Prevention of Gynecologic Pathology."

Society News.—Drs. Kenneth K. Sherwood and Sylvester N. Berens, Seattle, addressed the Pierce County Medical Society, Tacoma, October 8, on "Arthritis and Focal Infection" and "The Intervertebral Disk" respectively.—Speakers before the King County Medical Society, Seattle, October 21, were Drs. Kenneth K. Sherwood, on "Medical Aspects of Postoperative Complications"; Joseph Gordon Spendlove, "Postoperative Complications of Anesthesia," and Edwin A. Nixon, "Postoperative Complications of Surgery."—Drs. Milburn H. Querna and Joseph W. Lynch addressed the Spokane County Medical Society, Spokane, October 10, on "Mechanics of Respiratory Function, Clinical Applications" and "Headache, Mechanism and Treatment" respectively.—Dr. Homer D. Dudley, Seattle, addressed the Walla Walla Valley Medical Society, Walla Walla, October 10, on "Acute Infections of the Hand."

GENERAL

"Nervous Insomnia" and Bad Checks.—A physician in Des Moines, Iowa, reports that a bad check swindler has again been imposing on the medical profession. A man in his early thirties, well groomed and intelligent, has been calling on physicians to get a prescription for "nervous insomnia." He claims to be a district sales manager for a large company just being transferred to the territory. The physician in his previous locality, he states, advised two prescriptions, one of phenobarbital for a daily sedative and one of seconal or nembutal if all else fails. He then asks where to take the prescription, cashing a small check at the drugstore on a local bank. The man is said to be a former student of osteopathy in Des Moines who was discharged for theft. In warning physicians, the Iowa physician calls attention to a peculiarity of rotation of the left eye.

American Society of Tropical Medicine.—The thirty-sixth annual meeting of the American Society of Tropical Medicine will be held in Louisville, Ky., November 12-15, in conjunction with the American Academy of Tropical Medicine and the National Malaria Committee during the annual session of the Southern Medical Association. The Walter Reed Medal will be awarded to Dr. Herbert C. Clark, Gorgas Memorial Institute of Tropical and Preventive Medicine, Inc., Panama, C. Z., and the fifth Charles Franklin Craig Lecture will be delivered by Dr. Rolla E. Dyer, U. S. Public Health Service, Washington, D. C., on "The Control of Typhus Fever." Among other speakers will be:

- Drs. Clarence A. Mills and Joseph W. Colvin, Cincinnati, Thiamine Protection Against the Depressive Effects of Tropical Heat.
John F. Kessel, Ph.D., Los Angeles, Recent Advances in the Study of Coccidioides in Infection.
Dr. Henry E. Meleney and Thomas L. Snyder, Ph.D., Nashville, Tenn., The Excystation of Endamoeba Histolytica in Bacteriologically Sterile Media.
Carl M. Johnson, Sc.D., Ancon, C. Z., Naturally Acquired Infections of Endamoeba Histolytica in Rhesus and Ateles Monkeys.
Ralph R. Parker, Ph.D., U. S. Public Health Service, Hamilton, Mont., Rocky Mountain Spotted Fever.
Drs. Harry Most and Milton Helpert, New York, Trichinosis in New York.

Dr. Louis L. Williams Jr., U. S. Public Health Service, will deliver his presidential address at the annual luncheon Wednesday on "Malaria Along the Burma Road." The Academy of Tropical Medicine will have its seventh annual dinner Thursday evening at the Hotel Seelbach, at which Dr. Charles S. Butler, U. S. Navy, retired, will give his presidential address on "Some Contributions of United States Naval Medical Officers to Science." The National Malaria Committee will hold its meeting Friday at the Seelbach under the chairmanship of W. G. Stromquist, health and safety department, Tennessee Valley Authority, Chattanooga, Tenn.

CORRECTION

Tattooing for Pruritus Ani.—In THE JOURNAL, October 12, page 1309, in the abstract of Turell's article the word "not" was omitted in the sentence beginning "Tattooing with mercuric sulfide is not done . . ."

Foreign Letters

LONDON

(From Our Regular Correspondent)

Sept. 14, 1940 (delayed).

The Treatment of Wound Shock

The Committee on Traumatic Shock and Blood Transfusion, appointed by the Medical Research Council, under the chairmanship of Prof. A. N. Drury, F.R.S., has presented a report on the treatment of wound shock. As the committee consists of the leading physiologists, biochemists, pathologists, physicians and surgeons of the day, the report is for the time the last word on the subject. Primary shock, which follows soon after injury and is not due to hemorrhage, resembles fainting. It responds to simple measures. The report deals at length only with secondary or wound shock, which develops insidiously some hours after injury. It is characterized by weakness, pallor and raised pulse rate and, in advanced cases, by lowered body temperature, sweating, low blood pressure, rapid thready pulse, vomiting and intense thirst. Medical officers should train themselves to recognize wound shock in its earliest stages, for it is then that treatment is likely to be effective. Wound shock closely resembles hemorrhage clinically and is likewise circulatory failure due to diminished blood volume, but loss of blood and plasma into the tissues produces the latter. Shock results from many factors besides loss of blood—fatigue, dehydration, pain and exposure to cold and wet—all of which demand attention in treatment. In some cases no more is necessary, but in the majority active steps to restore blood volume must be taken as early as possible. Reduction of blood volume is the constant and important feature and on its treatment success depends.

During military operations the most that can be done in advanced positions is to limit hemorrhage and loss of plasma by a firm bandage or tourniquet and by splinting to prevent pain and local loss of plasma due to movement of a fractured limb during transportation. The wounded must be protected from cold, and it is of great importance to give water freely and repeatedly except to those who are unconscious or have abdominal wounds. It should preferably contain 1 teaspoon of salt to the pint. The army transfusion apparatus allows blood or plasma to be administered at least as far forward as main dressing stations. Open wounds of the chest should be closed immediately, as otherwise they have a high mortality.

A patient unfit by reason of shock for immediate operation should be put in a resuscitation ward, where greater rest and quiet can be ensured than in a busy general ward. Wet and dirty clothes must be cut off with as little disturbance as possible and the patient should be clothed in warm pajamas and the bed warmed. For the relief of pain morphine from one-fourth to one-half grain (0.016 to 0.032 Gm.) subcutaneously is of exceptional value. When the circulation is too slow for quick absorption an almost immediate effect can be obtained by intravenous injection of up to one-fourth grain. The most valuable single method for combating shock is blood transfusion. Whole blood is of proved value, but human plasma or serum, because of their superior keeping qualities, are more convenient under field conditions. In extensive burns, in which reduction of blood volume is due entirely to loss of plasma, replacement by plasma or serum is theoretically correct. Even in hemorrhage, serum proteins and an adequate blood pressure may be of greater value than an increase of oxygen-carrying power. When blood, plasma or serum is not available, isotonic saline or dextrose solution may be used, but the restoration of blood volume is only transient by intravenous infusion of these solutions and is not devoid of risk. Because of the dehydration, repeated and copious drinking of fluids should be encouraged, with the exceptions mentioned. If necessary, the rectal route

may be used. Oxygen should be given to all who manifest cyanosis of the lips, ears or nails. It is especially necessary in any interference with respiration, as in chest wounds. In cases of infected wounds, absorption of toxins aggravates shock. Infected tissue must therefore be promptly removed and chemotherapy and other forms of treatment given. For cases requiring anesthesia, gas and oxygen, combined with ether, if necessary, is the mixture of choice, provided a skilled anesthetist and apparatus are available; otherwise ether alone should be used. Chloroform or spinal anesthesia should not be employed. The administration of an anesthetic to a shocked patient requires special care.

The Protection of Glass in Hospitals

Air raids have given rise to many problems in connection with the security of hospitals. The Research and Experiments Branch of the Ministry of Home Security has issued a memorandum on the protection of glass in hospitals. Three ways are suggested to minimize the scattering of glass from windows: (1) by covering the windows with wire netting of half inch or smaller mesh fixed to detachable frames, (2) by covering them inside with light weight screens which will cause the broken glass to fall close to the window and (3) by covering the glass with "anti-scatter material." The last can be done in four ways, which, in the order of effectiveness, are as follows: (a) Strong textile netting or some other fabric is stuck firmly to the glass. This is best applied with a preparation insoluble in water as varnish or lacquer. Thick and tough paper may be applied; crisscross strips are not recommended. (b) Cellulose film with varnish or lacquer as a waterproof coat is used. (c) Strips of material not less than 1½ inches wide and spaced to give not more than 6 inches of clear glass between the strips are used. (d) Liquid coatings, such as rubber latex, are applied but are not effective for panes more than 4 square feet.

It is recommended that all glass in operating rooms, except that in utensils and suspended light fittings, be removed. Window openings should be completely bricked up or barricaded and any roof-light opening would be covered by concrete slabs, sandbags or timber. If this is done and the operation light is a single freely suspended unit, fracture of the glass is not likely.

Medical War Relief Fund

As the benevolent funds of the medical profession are hard put to provide for ordinary cases of hardship, a special fund has been established for the temporary assistance of physicians and their dependents who are in financial straits from war conditions. For the organization of this fund a committee has been formed consisting of officers of the British Medical Association, the presidents of the Royal Colleges of Physicians, Surgeons and Obstetricians and Gynecologists, the chairman of the Charities Committee of the British Medical Association and the president of the Royal Medical Benevolent Fund. The sum of \$13,500 has been collected in a short time. As the medical profession has suffered less than other professions from the disturbances of the war, it is thought that it should itself come to the assistance of its own members.

Marriages

HARRY D. FEINBERG, Long Branch, N. J., to Miss Minna Liebesman of Asbury Park, June 28.

BLANCHARD FRED FORD JR., Clover, S. C., to Miss Marjorie Nelle Wells at Bennettsville, July 6.

WILLIAM J. EGAN, Boston, to Miss Mary J. Sullivan of Newton Highlands, Mass., July 10.

SAMUEL ARTHUR PURVES, Des Plaines, Ill., to Miss Rae McKnight of Boston, July 13.

WILLIAM COHEN, Portland, Ore., to Dr. STELLA FISHER of New York, June 30.

Deaths

Charles Nicoll Bancker Camac, Altadena, Calif.; University of Pennsylvania Department of Medicine, Philadelphia, 1895; instructor of physiology at his alma mater in 1895; instructor of physical diagnosis, chief of medical clinic, lecturer in medicine from 1905 to 1909 and professor of clinical medicine, 1909-1910, at the Cornell University Medical College, New York; assistant professor of clinical medicine at Columbia University College of Physicians and Surgeons, New York, from 1910 to 1938; emeritus professor of internal medicine at the New York Polyclinic Medical School and Hospital; visiting physician from 1899 to 1916 and consulting physician from 1916 to 1935 at the New York City Hospital; served during the World War; member of the Association of American Physicians; director of medicine, Gouverneur Hospital of Bellevue and Allied Hospitals, New York, from 1916 to 1923; author of "Imhotep to Harvey: Backgrounds of Medical History"; aged 72; died, September 27.

Joseph Patrick Brennan, Buffalo; University of Buffalo School of Medicine, 1908; member of the Medical Society of the State of New York; served during the World War; past president of the Buffalo Academy of Medicine; on the staffs of the Emergency Hospital of the Sisters of Charity, St. Mary's Infant Asylum and Maternity Hospital and the Millard Fillmore Hospital; aged 56; died, September 28, of coronary thrombosis.

Philip Eugene Garrison ♂ Surgeon Lieutenant Commander, U. S. Navy, retired, Ridgewood, N. J.; George Washington University School of Medicine, Washington, D. C., 1906; entered the navy in 1906 and retired in 1933 for incapacity resulting from an incident of service; aged 62; died, September 22, in the United States Naval Hospital, Brooklyn, of carcinoma of the liver and acute nephritis.

Thomas Lafayette Walker Bailey, Clinton, S. C.; Medical Department of Grant University, Chattanooga, Tenn., 1893; member of the South Carolina Medical Association; for many years trustee of the local schools; past president of the Laurens County Medical Society; aged 70; died, September 29, in the South Carolina Sanatorium, State Park, of pulmonary tuberculosis and cerebral hemorrhage.

John Clarence Smith, Jackson, Mich.; University of Michigan Homeopathic Medical School, Ann Arbor, 1907; member of the Michigan State Medical Society; past president of the Jackson County Medical Society; member of the board of managers and on the staff of the W. A. Foote Memorial Hospital; on the staff of the Mercy Hospital; aged 58; died, September 3, of coronary disease.

Wilson Kirt Dyer ♂ El Reno, Okla.; Eclectic Medical Institute, Cincinnati, 1908; member of the Illinois State Medical Society and the American Psychiatric Association; chief medical officer of the Federal Reformatory; formerly on the staffs of the East Moline (Ill.) State Hospital and the Peoria (Ill.) State Hospital; aged 55; died, September 20, of coronary thrombosis.

Joseph Lawrence Adams, Asheville, N. C.; Jefferson Medical College of Philadelphia, 1910; member of the Medical Society of the State of North Carolina; served during the World War; on the staff of the Asheville Mission Hospital and the Aston Park Hospital; aged 55; died, September 27, of intestinal hemorrhage and hypertensive heart disease.

Frederic Almon Thayer ♂ Beloit, Wis.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1903; past president of the Rock County Medical Society; on the staff of the Beloit Municipal Hospital; aged 68; died, September 5, of coronary embolism.

Clement Dunham Smith ♂ Dayton, Ohio; Medical College of Ohio, Cincinnati, 1901; past president of the Montgomery County Medical Society; for many years on the staff of St. Elizabeth's Hospital; aged 62; died, September 4, in the Miami Valley Hospital of cerebral hemorrhage.

Louis Austin Bolling, Otterbein, Ind.; St. Louis College of Physicians and Surgeons, 1897; member of the Indiana State Medical Association; served during the World War; formerly on the staff of the Epworth Hospital, South Bend; aged 73; died, September 10, of heart disease.

Vern Leonard Hamilton, Pendleton, Ore.; Willamette University Medical Department, Salem, 1913; member of the Oregon State Medical Society; aged 57; died, September 13, of injuries received when he was struck by an automobile.

Harold Rowland Whiteside, Redding, Calif.; University of Oregon Medical School, Portland, 1933; member of the California Medical Association; aged 36; died in September at Sacramento of anterior poliomyelitis, bulbar type.

Charles Wallington Alden, Saginaw, Mich.; Bellevue Hospital Medical College, New York, 1877; formerly president of the city board of health, health officer and county coroner; aged 82; died, September 12, of a fractured hip.

Phillip Francis Hickey ♂ Smethport, Pa.; St. Louis University School of Medicine, 1933; aged 31; on the staff of the Kane (Pa.) Community Hospital, where he died, September 19, of injuries received in an automobile accident.

Wallace Ray Swartzwelder, York, Pa.; University of Maryland School of Medicine, Baltimore, 1927; member of the Medical Society of the State of Pennsylvania; aged 40; died in September of a self-inflicted bullet wound.

John O. Handley, Sycamore, Ala.; Memphis (Tenn.) Hospital Medical College, 1904; member of the Medical Association of the State of Alabama; died in September at the Citizens' Hospital, Talladega, of a gunshot wound.

Francis Johnston Sloane, Princeton, N. J.; Columbia University College of Physicians and Surgeons, New York, 1908; aged 56; was killed, September 5, near Mexico City, Mexico, in an automobile accident.

Perkins Glover, Arvon, Va.; Medical College of Virginia, Richmond, 1901; member of the Medical Society of Virginia; member of the county board of health; aged 66; died, September 5, of coronary thrombosis.

Homer H. Gates, Franklin, La.; Medical Department of Tulane University of Louisiana, New Orleans, 1899; member of the Louisiana State Medical Society; aged 64; died, September 27, of angina pectoris.

Albert Sidney Jarvis, Troup, Texas; University of Louisville (Ky.) Medical Department, 1894; at one time postmaster; formerly bank president; aged 72; died, September 7, of coronary occlusion.

Hiram D. Vaughtner, Byers, Texas; Memphis (Tenn.) Hospital Medical College, 1903; member of the State Medical Association of Texas; aged 73; died, September 10, of cerebral hemorrhage.

Lawson Silas Henley, Huntington, W. Va.; University of Louisville (Ky.) Medical Department, 1905; member of the West Virginia State Medical Association; aged 67; died, September 16.

Max Dobrow, Chicago Heights, Ill.; Jenner Medical College, Chicago, 1917; for many years city police physician; aged 56; died, September 20, in St. James Hospital of appendicitis.

Nicholas Matthew Crofts ♂ North Adams, Mass.; Baltimore Medical College, 1898; served during the World War; aged 74; died, September 17, of coronary thrombosis.

George Frederic Cullens, New Albany, Miss.; Memphis (Tenn.) Hospital Medical College, 1892; aged 69; died, September 15, of aortic regurgitation and myocarditis.

Harvey T. Wickert, Emmaus, Pa.; University of Pennsylvania Department of Medicine, Philadelphia, 1876; aged 85; died, September 11, of cerebral hemorrhage.

Jeremiah W. Trueblood, Monroe City, Ind.; Hospital College of Medicine, Louisville, Ky., 1891; aged 88; died, September 6, of uremia and chronic nephritis.

Melissa Evelyn Thompson Coppin, Philadelphia; Woman's Medical College of Pennsylvania, Philadelphia, 1910; aged 62; died, September 27, of acute endocarditis.

Julia Helen Bass, San Antonio, Texas (licensed in Texas by years of practice); aged 82; died, September 25, of acute pyelocystitis, uremia and arteriosclerosis.

Henry G. Brueckbauer, Sheboygan, Wis.; Homeopathic Medical College of Missouri, St. Louis, 1904; aged 62; died, September 16, of coronary thrombosis.

Louis Woodruff Armstrong ♂ Danville, Ind.; University of Maryland School of Medicine, Baltimore, 1900; aged 64; died, September 19, of angina pectoris.

Thomas Clifford Burnes, Randolph, Vt.; University of Vermont College of Medicine, Burlington, 1937; aged 27; died, September 9, of cerebral hemorrhage.

George Temple Beckett, Arlington, Ind.; University of Indianapolis Medical Department, 1899; aged 68; died, September 28, of coronary thrombosis.

David Marion Higgins ♂ Gainesville, Texas; Hospital College of Medicine, Louisville, Ky., 1893; aged 72; died, September 16, of coronary thrombosis.

Bureau of Investigation

FONG WAN, THE CHINESE HERBALIST

Herbert Corey, in *Nation's Business* for September 1940, under the heading "Washington and Your Business," submits the following item:

"Ever since the introduction of the Logan-Walter bill for the bridling and saddling of the government bureaus interest in their oddities has been growing. Here's a sample:

"The Post Office Department barred a Chinese doctor from the mails. He went to court, alleging that the drugs he used had been in the Chinese materia medica for 2,000 years, and produced many witnesses who testified that the Chinese drugs had cured them. The verdict of the court was in his favor.

"The Post Office still bars him from the mails."

Obviously Corey means to imply by this that since the Chinese "doctor" was found not guilty in court, the order barring him from the mails should no longer be in force and that in some unspecified way the Post Office Department is acting in disregard to the considered judgment of a court of record. While THE JOURNAL holds no brief for the pronounced extension of administrative agencies and their powers, the item quoted above seems to be unjust to the Post Office Department.

This Bureau cannot be positive as to which case Corey is referring to, but the case of one Fong Wan does meet the facts referred to by Corey. This is not the first time that Fong Wan has had the attention of this Bureau. As a matter of fact, THE JOURNAL for June 6, 1931, contained an article concerning him and a fraud order which was issued the previous year and which is still in effect.

This fraud order was issued in accordance with what has often been referred to as the Fraud Order Law (U. S. Code, Title 39, Sec. 259), which reads in part as follows:

"The Postmaster General may, upon evidence satisfactory to him that . . . any person or company is conducting any scheme or device for obtaining money or property of any kind through the mails by means of false and fraudulent pretenses, representations, or promises, instruct postmasters at any post office at which registered letters or any other letters or mail matter arrive directed to any such person or company . . . to return all such mail matter to the postmaster at the office at which it was originally mailed, with the word 'Fraudulent' plainly written or stamped upon the outside thereof; and all such mail matter so returned to such postmasters shall be by them returned to the writers thereof, under such regulations as the Postmaster General may prescribe.

The statute is not *penal*, it is not a *criminal* statute. It simply authorizes the Postmaster General to protect the public from palpable frauds coming to his attention. Any person to whom the mails have been so closed presumably has adequate *civil* remedies, if he considers himself aggrieved, to compel the use of the mails.

Some time later Fong Wan was indicted under the Federal Criminal Laws for using the mails to defraud. He did not go to court as might be inferred from Corey's item to question the fraud order and to ask the courts to require the Post Office to let him use the mails, but because he was accused of violating U. S. Code, Title 18, Sec. 338, the material part of which reads:

"Whoever, having devised or intending to devise any scheme or artifice to defraud, or for obtaining money or property by means of false or fraudulent pretenses, representations or promises . . . shall, for the purpose of executing such scheme or artifice or attempting so to do, place, or cause to be placed, any letter, postal card, package, writing, circular, pamphlet, or advertisement, in any post office, or station thereof, or street or other letter box of the United States, or authorized depository for mail matter, to be sent or delivered by the Post Office Establishment of the United States, shall be fined not more than \$1,000, or imprisoned not more than 5 years, or both."

The intent of the authorities was to see that he was punished criminally for his acts. *He was not convicted.* But this has absolutely no relation to the fraud order. This may be illustrated by noting that the acquittal of a physician on a *criminal* charge of abortion will not prevent the appropriate licensing agency from revoking his license to practice for performing an *illegal* abortion.

Now let us see just what Fong Wan has done to warrant the issuance and continuance of the fraud order.

The evidence indicates that Fong Wan, who, so far as THE JOURNAL knows, has never been licensed to practice any form of the healing art in any state in the Union, has offered treat-

ments for practically every disease under the sun. For example, one of his remedies is offered for diabetes and he was promoting it as a cure in 1930. If it really did cure, every diabetic person in California would be availing himself of the opportunity of taking it by this time. Thus there should be no more deaths from diabetes in California.

Wan has promoted his products on the basis of the teachings of a former Chinese emperor known as Shin Nong, which, he says, means "Divine Farmer." According to some of the publicity of the Fong Wan Herb Company of Oakland:

"He [Shin Nong] believed that all things on earth were included in five natural elements: water, fire, vegetation, mineral and earth. The color predominating in the vegetation element is green. Because the liquid contained in the gall bladder and the juices secreted by the liver are greenish, he concluded that the gall bladder and liver belonged to the vegetation element. The natural color of the fire element is red. As the heart controls the circulation of the blood of the body, and as the blood is red, he said that the heart belonged to the fire element. The natural taste of the water element is salty. As the urine, which passes through the kidneys into the bladder, is salty, these two organs were classified under the water element. The natural color of the earth element is yellow. As Shin Nong believed that the stomach gets its power from the spleen, and as the gastric juice of the stomach is yellow, he classified the spleen and the stomach as belonging to the earth element. As the color of the natural element in mineral is white, and as the lungs are white, he concluded that they belonged to the mineral element."

On Dec. 14, 1939, the Federal Trade Commission at Washington issued a complaint against Fong Wan, charging him with misrepresentation in advertising matter, in newspapers and periodicals and in a booklet designated "Herb Lore" (from which the foregoing quotation concerning Shin Nong was taken) concerning the remedial benefits of Chinese herbs sold and distributed by Fong Wan and his co-partners. The complaint charged that in advertising matter the respondents represented that the herbs sold by them "are a remedy, cure and effective treatment for heart trouble, high blood pressure, colds, influenza, asthma, pyorrhea, blood disorders, cross eyes and other eye troubles, cancer, stomach troubles, dysentery, pains, dizziness, hardening of the arteries, gout, bronchial trouble, coughs, sinus trouble, liver and gallbladder troubles, diabetes and other disorders of the kidneys and bladder, nervous attacks and disorders, arthritis, obesity, headaches, neuritis and piles, and that they stop pain and give permanent relief from asthma and other disorders."

The complaint alleged that "in truth and in fact the respondents' Chinese herbs are not a remedy or cure for any of the ailments or diseases named; that they do not and cannot wash away any diseases from the human body; that Fong Poy or Fong Wan is not able to diagnose or heal diseases or ailments, nor has he restored the health of any persons by the use of Chinese herbs."

The outcome of this case is, of course, not known at the present time. It is interesting to note, however, that on February 26 of this year Fong Wan issued a fourteen page advertisement in the *Oakland Tribune*, reproducing some of the testimony that had been transcribed at the Federal Trade Commission hearing in connection with the complaint noted. It has been reported to us that Fong Wan paid \$4,850 for the printing of this advertisement, which comprised a section of the *Oakland Tribune*. The heading of this advertisement was "Marvelous Results Derived From Fong Wan Chinese Herbs Have Been Testified Before the Federal Trade Commission at San Francisco, California," and the subheading read "Numerous Witnesses at Commission Hearing Tell of Instances Where They Were Relieved by Use of Chinese Herbs. Following is Copy of Official Transcript of Testimony in Fong Wan Hearing." On the final page of this section of the *Oakland Tribune* there appeared some excerpts from the booklet "Herb Lore," and under the heading "Unparalleled Success of Fong Wan, Herbalist" it is stated that since the establishment of his herb business in Oakland in 1915 he has won more than twenty cases in the police court. Again quoting from the advertisement:

"In 1924-1925, some lawyers and Chinese women combined to sue him for \$25,000 in a slander suit (that had been predicted in his horoscope at the time of his birth). He won this case in both the Appellate and the State Supreme Courts. This suit cost the plaintiffs at least \$3,000."

He claimed further that "In 1925 the Anti-Herb Bill was introduced. An investigation by the State Assembly at Sacra-

mento was started. It cost the State of California no less than \$6,000 (and showed many indications that it was a bill of graft)."

Finally, it is claimed that "For more than 20 years Fong Wan has realized that the medicos, after having failed in their attempts to put the chiropractors and healers of other schools out of business, would center their attention on the Chinese herbalists. Being the most renowned herbalist in America, Fong Wan also suspected that he would be the target."

If one may judge by the transcript of the Federal Trade Commission hearing which is detailed in his advertisement, the principal defense of this herbalist is the testimony of individuals who claim to have been cured, and, incidentally, individuals who have submitted testimonials which are used in advertising the products. The fact that these individuals are not qualified either to diagnose their own condition or to determine whether or not they have been cured of that condition indicates that the evidence for the usefulness of his preparations is far from scientific.

A few excerpts from the booklet "Herb Lore" will serve to illustrate the type of hokum which it contains:

"It is customary in America for people to have electric toasters on their table and to make lots of toast. Even sick persons in the hospitals are frequently served hot toast without regard to their ailments. Most people never stop to think that toast takes in the direct fire heat, and that the butter, which is fat-giving, adds more heat to the body. A little toast occasionally does no harm, but if a person eats hot buttered toast every day, some of the following ailments will appear sooner or later: headache, tiredness of the eyes, sinus inflammation, stomach ulcers, cold sores, canker sores, etc. If one wishes to avoid overheating the system, it is best to eat steamed or boiled food."

We also find:

"In the United States of America, due mainly to the persistency of the Chinese herbalists themselves and their willingness to endure persecution for the sake of their profession, the use of Chinese Herbal Remedies has been gradually introduced. At the present time, scientists are keenly interested in Chinese Herbs. The chemists of the University of California and of other universities in the United States are making intensive studies and carrying on numerous experiments in order to determine scientifically the exact effects of certain Chinese Herbs upon the human system."

Such a statement as the final one in the preceding paragraph would indicate that the promoter has little concern as to whether or not scientific experimentation will demonstrate just how ineffective these remedies will be found to be. Elsewhere in the booklet Fong Wan expresses the belief that the scientists will have trouble determining the efficacy of the remedies:

"Extracts of various Chinese herbal remedies have been subjected to chemical processes in order to precipitate their elements. However, many kinds of herbs and roots show nothing in the test tube; consequently, the chemists cannot determine their uses. For example, a chemist is never able to discover the elements of the Ginseng Root which is a wonderful remedy in building up the air circulation in the body. For the past fifty centuries, the Chinese have used Ginseng Root to strengthen the air circulation and have combined it with other herbal remedies to improve the blood circulation."

"Articles written by chemists or pharmacists frequently appear in the newspapers ridiculing the Chinese as being superstitious in believing that Ginseng has great medicinal value. Because these writers cannot see the curling of the smoke, they say there is no fire."

In case the reader might think that some herbs were drugs or vice versa, the following statement is made:

"Naturally, when we look at the words 'drug' and 'herb,' we think of them as being related. Each consists of four letters. There, however, the resemblance ends."

On the basis of such statements, the reader is introduced to herb lore. The remainder of the booklet is made up of chapters concerning the various organs of the human body, for example the stomach, the spleen, the heart, the lungs and the throat. Each chapter opens with the Chinese theory regarding the subject and closes with testimonials of those who claim to have suffered from diseases affecting those organs and to have obtained relief from the use of Fong Wan's remedies. His testimonial writers claim cures for everything under the sun. One individual, Gregory G. Souza of Oakland, Calif., stated that he had a very sore throat which the doctor pronounced a case of diphtheria. But, remembering that Fong Wan had rid his sister of a long-standing cough which the doctors had called consumption, and restored his cousin, who suffered from dropsy, to perfect health, he decided to try him. Within two hours after taking Fong Wan's remedy, all the pain in his throat was gone and the swelling had subsided.

As an afterthought, Souza added: "Recently I suffered from Cancer of the Navel and the pain became so severe that I was confined to my bed for three weeks. Again I had recourse to Fong Wan, and I am happy to say that the cancer has now entirely disappeared and I am well and strong."

Mrs. Emma Kennedy of Vallejo, Calif., wrote as follows:

"To Whom It May Concern:

I suffered from Diabetes, Heart Trouble and Nerves for some time. It seemed as though no relief could be had anywhere. Two months ago, however, I began to drink Fong Wan Herbs and I soon realized their healing power. I am happy to testify that my troubles have been entirely overcome and that I now feel like a new woman. I am writing these few lines in order that others so afflicted may know where to find relief."

Citizens of the United States should be exceedingly proud that federal laws permit a fraud order to remain in force against an individual who is obviously engaged in fraudulent practices, even though he has been able to obtain a verdict of not guilty in a case in the courts under what is referred to as the Fraud Law. The postal authorities are to be commended for continuing the fraud order and thus interfering to some extent with the activities of this individual. Sooner or later the state authorities of California may enter the picture. In the meantime, it will be interesting to note the outcome of the Federal Trade Commission case.

MISBRANDED PRODUCTS

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the United States Department of Agriculture

[EDITORIAL NOTE.—These Notices of Judgment are issued under the Food, Drug and Cosmetic Act and in cases in which they refer to drugs and devices they are designated D. D. N. J., cosmetics C. N. J., and foods F. N. J. The abstracts that follow are given in the briefest possible form: (1) the name of the product; (2) the name of the manufacturer, shipper or consigner; (3) the composition; (4) the type of nostrum; (5) the reason for the charge of misbranding, and (6) the date of issuance of the Notice of Judgment—which is considerably later than the date of the seizure of the product and somewhat later than the conclusion of the case by the Food and Drug Administration.]

Bad-Ex-Salts.—American Laboratories, Carlisle, Pa., and E. J. Barry, Inc., New York. Composition included tartar emetic. Laxative and tonic. Dangerous to health when used as directed.—[D. D. N. J., F. D. C. 44; May 1940.]

Bromo-Seltzer.—Emerson Drug Co., Baltimore. Composition: an effervescent mixture of acetanilid, sodium bromide and caffeine. For headache, neuralgia and disordered stomach and nerves. Dangerous to health when used as directed.—[D. D. N. J., F. D. C. 81; May 1940.]

Cal-co-ein.—Crescent-Kelvan Co., Philadelphia. Composition: calcium salts of benzoic acid and cinchophen. For arthritis. Declared potentially injurious if used as directed.—[D. D. N. J., F. D. C. 10 and 77; May 1940.]

Cephalgine Tablets.—Cephalgine Co., Spencer, Mass. Composition: acetanilid, caffeine and camphor. For simple headaches, neuralgia and muscular pains. Dangerous to health when used as recommended.—[D. D. N. J., F. D. C. 80; May 1940.]

Guerlain Lipsticks (Nos. 144, 145 and 160).—Guerlain, Inc., New York. Composition included cadmium and selenium. Declared potentially injurious if used as directed.—[C. N. J., F. D. C. 16; May 1940.]

Hydecocyl.—Murray Oil Products Company and Industrial Oil Products Corporation, Los Angeles. Composition: not more than 50 U. S. P. units of vitamin D per gram, whereas represented to contain 85 such units.—[D. D. N. J., F. D. C. 84; May 1940.]

Magic-Di-Stik Lash and Brow Dye.—Magic-Di-Stik Co., Los Angeles. Composition included paraphenylenediamine. Declared potentially injurious if used as directed.—[C. N. J., F. D. C. 3 and 4; May 1940.]

Madam Marva Hair Coloring.—Madam Marva Products Co., St. Louis. Composition included paraphenylenediamine. Declared potentially injurious if used as directed.—[C. N. J., F. D. C. 14; May 1940.]

Tru-Lax Mint Flavored Chewing Laxative.—Peltz-Kauffer Co., Inc., South Bend, Ind. Composition included 1 grain of phenolphthalein. Dangerous to health if used as directed.—[D. D. N. J., F. D. C. 43; May 1940.]

Universal Formula.—Universal Antiseptic & Research Laboratories, Inc., Bristol, Tenn. Composition: essentially alum, borax, sugar, water, carboic acid (1.84 per cent) and small proportions of aromatic substances, including thymol and sage. Not antiseptic when diluted as directed on label. Falsely represented as efficacious for sinus trouble, quinsy, asthma, catarrh, tonsillitis, croup and a great many other disorders.—[D. D. N. J., F. D. C. 46; May 1940.]

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

ADDICTION TO AMPHETAMINE (BENZEDRINE) SULFATE

To the Editor:—A man who has become addicted to the use of benzedrine sulfate has been taking the drug now for nearly two and one-half years on an average of a dozen 10 mg. tablets daily and has taken as many as twenty-four a day. Briefly, he was a confirmed alcoholic addict and after a terrific debauch in February 1938 he wanted something to pep him up and also something to take when he felt the craving for alcohol. More in the spirit of experimentation than anything else I prescribed benzedrine sulfate tablets, two daily. I didn't see him for several months; then he came looking fine; he had gained weight and claimed that the taking of the drug had completely banished his desire for alcohol. He said, however, that if he missed taking the benzedrine he would get a terrific craving. I warned him at that time about the possible danger of the drug but decided it was the lesser of two evils. I lost track of him for some time. A few weeks ago he turned up for a prescription, since a new state law recently passed requires one for all such drugs. He then told me he had been taking them continuously and at the rate of ten or twelve daily. He is an automobile salesman and claims that he can't carry on his daily routine without them. Withdrawal causes nervousness, exhaustive fatigue and inability to think straight and, believe it or not, sleeplessness. He has not lost any weight since I first saw him and appears to be in fairly good health. In spite of the fact that he has been a lifetime drunkard he has not touched a drop since he began taking the tablets. He is a white man aged 49, he weighs 123 pounds (56 Kg.) and his blood pressure is 115 systolic, 90 diastolic. He is in good health otherwise except for a hernia he has had for twenty years and a recently developed fistula in ano. Please advise me how I can get him off the drug, also what organic effects it will cause if he continues its use. Please bear in mind the danger of his resuming his alcoholic course if I suddenly withdraw the drug.

L. J. Hahne, M.D., Savannah, Ga.

ANSWER:—Until recently there have been no specific reports of cases of addiction to amphetamine (benzedrine) sulfate, although the Council on Pharmacy and Chemistry has repeatedly warned physicians against such a possibility ever since this was first pointed out in its report on the drug (Report of the Council on Pharmacy and Chemistry, Present Status of Benzedrine Sulfate, *THE JOURNAL*, Dec. 18, 1937, p. 2064). At that time the question of tolerance to the drug and the possibility of cumulative effects were not definitely settled. S. P. Waud has since reported (The Effects of Toxic Doses of Benzyl Methyl Carbinamine (Benzedrine) in Man, *THE JOURNAL*, Jan. 15, 1938, p. 206) that a definite tolerance for amphetamine is slowly built up and that increasing doses are necessary to produce the original effects. While indicating that the question of addiction was not settled at that time, he pointed to its likelihood as a possibility because "most drugs that produce a pleasant effect on the brain (either stimulating or quieting in nature) have their addicts." He also indicated that the stimulation of the central nervous system is definite but relatively temporary and is always followed by fatigue and mental depression when toxic doses of amphetamine are absorbed. *THE JOURNAL* later published an editorial (Benzedrine Sulfate—A Warning, March 19, 1938, p. 901) warning against the use of the drug for the treatment of obesity in otherwise normal individuals by reducing the appetite, because of the danger that such use may produce craving and even addiction in some instances. Furthermore, severe reaction and even death have been reported following the indiscriminate use of amphetamine sulfate (Apfelberg, Benjamin: A Case of Benzedrine Sulfate Poisoning, *THE JOURNAL*, Feb. 19, 1938, p. 575. Smith, L. C.: Collapse with Death Following the Use of Amphetamine Sulfate, *ibid.*, Sept. 9, 1939, p. 1022).

A case of addiction resulting from the continued use of amphetamine sulfate has recently been reported (Friedenberg, Sidney: Addiction to Amphetamine Sulfate, *ibid.*, March 16, 1940, p. 956). The drug was administered over a period of six months in doses of from 5 to 10 mg. twice a day for the treatment of obesity. Reduction of the dosage after this time was followed by fatigue and depression and a demand for larger doses. The author did not suggest a method for management of the addiction in this case but indicated that the problem was not a minor one and that possible deleterious results from long continued use have not yet been fully investigated. He reported no change in blood pressure, but hypertensive effects from the use of amphetamine (benzedrine) have also been reported (Morse, Withrow: Effects of Benzedrine on Blood Pressure, *THE JOURNAL*, Nov. 7, 1936, p. 1582. Beyer, K. H.: *J. Pharmacol. & Exper. Therap.* 66:318 [July] 1939).

The patient with addiction to amphetamine sulfate described in the inquiry appears to have developed a tremendous tolerance to the drug and in spite of the fact that no increase in blood pressure or loss of appetite or weight has been noted he may reasonably be expected to display more of the usual reactions due to the drug as tolerance is lowered by reduction in the dosage. Dautrebande, Philippot and Charlier (Pharmacodynamic Study of Benzedrine in the Animal, *Arch. Internat. de Pharmacod. et de therap.* 62:179 [June 30] 1939) indicate that both large and small single doses produce immediate hypertension but that large doses produce hypotension when a large dose has previously been given. This suggests a possible explanation for the absence of hypertension in the case in question. A high degree of tolerance would also tend to eliminate the outward signs of stimulation of the central nervous system. The appearance of nervousness and sleeplessness on withdrawal of the drug, however, is probably the result of irritability of a nervous system long subjected to stimulation, somewhat analogous perhaps to that which occurs in opiate addiction. Rapid reduction in the number of doses rather than the size of the dose or sudden complete withdrawal is regarded as the preferred method of management of addiction to most drugs and probably causes less suffering than gradual decrease in the size of the dose. The possibility of sudden collapse must be kept in mind however and, in view of the meager information concerning the effects from prolonged use, the patient should be institutionalized to afford constant surveillance and treatment of withdrawal symptoms. Barbiturates are recognized as useful in controlling overdosage of amphetamine sulfate and may be useful together with other sedatives to control insomnia, restlessness and other symptoms of withdrawal. Care must be taken to avoid addiction to these other drugs also. The memory of the feeling of well-being or exhilaration from the psychic stimulation produced by the drug may be controlled by scopolamine hydrobromide. After the immediate symptoms of withdrawal have subsided, the principal effort should be directed to psychotherapy. In the case described, the problem of addiction apparently still persists since this has been merely transferred from alcohol to amphetamine sulfate. Unless a change in the mental attitude can be brought about the patient is likely to return to the use of stimulants of one kind or another at the first opportunity. Apparently the drug has demonstrated to the patient that he can get along without alcohol and the same now must be shown for the drug.

The Council on Pharmacy and Chemistry has recently recognized the use of amphetamine sulfate as an adjunct in the treatment of chronic alcoholism on the basis of evidence that the use of the drug in such cases may permit a sufficient interval of sobriety for the institution of the usual and more fundamental psychotherapeutic approaches (Reifenstein, E. C., Jr., and Davidoff, Eugene: The Treatment of Alcoholic Psychoses with Benzedrine Sulfate, *THE JOURNAL*, May 28, 1938, p. 1811. Bloomberg, Wilfred: *New England J. Med.* 220:129 [Jan. 26] 1939). Reifenstein and Davidoff report best results in states of intoxication in which no psychosis is demonstrable. Bloomberg points out, however, that the drug is by no means a solution of the difficult problem of alcoholism but may be useful in cases in which there can be proper supervision. Bloomberg was quoted in *Queries and Minor Notes* (Amphetamine [Benzedrine] Sulfate for Alcoholism, *THE JOURNAL*, March 11, 1939, p. 1010) to emphasize that the probable real value of the treatment lies in the opportunity it may provide to inaugurate psychotherapy so that the gain made by improved rapport, confidence and sobriety may be consolidated by the more fundamental modifications of the alcoholic addict's personality and his attitude toward life. As is also indicated in this note, the Council has repeatedly deplored the use of amphetamine sulfate except under the strict and constant supervision of the physician.

TREATMENT OF POLYCYTHEMIA VERA

To the Editor:—What can be used to reduce the blood in polycythemia vera besides phenylhydrazine hydrochloride? I am a victim of this disease and want something besides phenylhydrazine hydrochloride.

M.D., Idaho.

ANSWER:—Polycythemia rubra vera always shows an increase in total blood volume as well as an increase in red cells per cubic millimeter, so the total mass of red cells may be exceedingly high. The purpose of treatment is to dispose of this excess. Acetyl phenylhydrazine is less toxic than phenylhydrazine and is the drug of choice. The effect of the drug depends on the sensitivity of the patient and the number of red cells to be destroyed, so a set dosage cannot be followed. Usually 0.1 Gm. of acetyl phenylhydrazine can be given daily for ten days. A blood count should be done each day. With a rapid drop in cells or the development of jaundice the drug should be dis-

continued until the full effect is obtained. The amount of drug necessary to keep the count down must be determined for each patient. Often one dose (0.1 Gm.) weekly is sufficient.

Since the treatment of polycythemia rubra vera is unsatisfactory with any drug, the tendency now is to rely entirely on venesections, thus producing a relative iron deficiency anemia. Large amounts of blood must be removed. If possible the amount to be removed should be calculated from the blood volume. Most untreated patients must have from 4 to 5 liters of blood withdrawn. After venesection the red cells become smaller, so that the red cell count is not a good indicator of the effect of a need for venesections. The venesections have to be repeated at intervals of from six to twelve months.

Irradiation is a third method of treatment. It seems best to irradiate the entire body rather than the bones alone. This procedure works well for some patients and is ineffectual for others.

ALTITUDE AND CHRONIC MALARIA

To the Editor:—I read with interest the answer in *Queries and Minor Notes* July 20 under "Treatment of Chronic Malaria." The discussion parallels experience with myself and many patients. I have had chronic malaria eleven years and have taken varied forms of treatment for from two to three months each spring and fall with partial relief during the time of actually taking treatment but with no lasting results. I will not attempt to enumerate all the drugs or combinations of drugs that I have taken during the eleven years but I have used them all except the Ascoli technic and it is my understanding that this technic creates an artificial high altitude. Am I correct in this assumption? The altitude of this city is about 200 feet and I have been here eleven years except for one period of two months spent in Boston, during which time I became entirely symptom free. What altitude is considered best for becoming free from parasites under proper antimalarial treatment? One little girl aged 6 years has had malaria since birth. What routine has been found most effective in treating children of this age? I find myself entirely agreeing with your statement that the treatment of chronic malaria is not the simple task it was thought to be ten years ago.

M.D., North Carolina.

ANSWER:—The "artificial high altitude" which the Ascoli technic produces is more apparent than real. In epinephrine therapy erythrocytes are supposedly squeezed out of the blood sinuses of the spleen and other viscera and surge through the peripheral circulation in greater numbers. However, this result is fugitive, whereas normal compensation to low oxygen tension in high altitudes results in a more or less permanent increase in the hematocrit. In attempting to recover from malaria, altitude is much less important than a cool, stimulating climate, combined with a well balanced diet and moderate exercise. Thus New England, the Appalachian highlands, Minnesota and Colorado are all good climates for patients with chronic malaria. Should relapses occur in bracing climates; adequate chemotherapy is more likely to be effective there than in the warm, enervating climates of the tropics.

SUNBURN AND SULFANILAMIDE ADMINISTRATION

To the Editor:—Could you give me any available information as to whether sunburn is a contraindication to the administration of sulfanilamide?

Louis Sohn, M.D., Brooklyn.

ANSWER:—Sunburn in itself is not a contraindication to the administration of sulfanilamide or its derivatives, provided there is a good reason for using these drugs. It has been definitely established that it is unwise for a patient who is receiving one or the other of these drugs to expose himself to the direct rays of the sun during a course of treatment, because in a certain number of instances photosensitization will take place and a dermatitis will result. For this reason patients who are receiving these drugs should keep out of the sun until from two to four days after the administration of the drug has ceased. This latter precaution is recommended in order to permit the drug to be completely excreted and hence to avoid possible photosensitization.

NO CHANGE IN WASSERMANN REACTION FROM SULFANILAMIDE

To the Editor:—Can a successful Wassermann test be made on a patient with a rash due to medication with sulfanilamide?

Frank E. Wiedemann, M.D., Terre Haute, Ind.

ANSWER:—As far as evidence is available there is no reason to believe that therapy with sulfanilamide or its derivatives produces changes in or reversals of the Wassermann reaction. In the course of a large experience no difficulty has been experienced in obtaining correct interpretations of the Wassermann reaction in cases of toxic dermatoses which had been produced by the administration of sulfanilamide.

BLUISH DISCOLORATION OF GUMS

To the Editor:—A woman aged 28, single, has a bluish-purple discoloration of the upper and lower gums. This is of five days' duration. She complains of tenderness of the gums, but there has been no bleeding or ulceration. The color is homogeneously distributed, not in a line. The only other complaint she mentions is vaginal bleeding for two days following cessation of her regular period. The discoloration is only of the gums. The tongue, throat and lips are normal. Physical examination is essentially negative. The red blood cell count is 3,800,000, the white cell count 7,500; hemoglobin 78 per cent; polymorphonuclear leukocytes 62 per cent, lymphocytes 27 per cent, eosinophils 8 per cent and monocytes 3 per cent. The red cells are normal in appearance. Coagulation and bleeding times are normal, as is the clot retraction. Urinalysis is normal. The Wassermann test also is negative. There is no history of exposure to lead, mercury or bismuth, or any mouth washes or other medicines. I am unable to find the cause of her complaint and would appreciate any suggestions you may have to offer with regard to further investigation or possible etiology.

M.D., Pennsylvania.

ANSWER:—A diagnosis cannot be made from the data. A bleeding disorder in its early stages, or a disorder with bleeding as a symptom, would be suggested. Such conditions as purpura, scurvy or aleukemic leukemia are to be kept in mind. Purpura with an allergic cause has been described, and the eosinophilia would fit this possibility.

Additional information is needed, especially a platelet count. The size of the spleen is important, as is the appearance of the rectal and vaginal mucosa. (It is presumed that the patient is afebrile.)

Repetition of other examinations may be necessary. The total white blood count and differential, and the bleeding tests should be rechecked. A determination of the vitamin C level of the blood, followed by an empirical use of a vitamin C concentrate, might be done if still indicated; cutaneous tests for important allergic substances can also be done if indicated. Further therapy will depend on the condition found. At times the diagnosis may be obscure, with only a progressive anemia as its evidence.

STERILIZATION IN HEART DISEASE AND TUBERCULOSIS

To the Editor:—What reason can one give for doing a major surgical procedure (sterilization) on a woman who has tuberculosis or heart disease when a minor operation can be performed on her healthy husband? Why should one not do a bilateral ovariectomy on the husband instead of a tubal resection on a bad risk wife? I refer especially to those women who already have a child or children.

M.D., New York.

ANSWER:—As a general proposition it is probably better to perform a sterilization operation on the partner who has a disease serious enough to demand the procedure. This is especially true in diseases such as tuberculosis, which may be rather rapidly progressive and eventually kill the patient. It does not seem quite fair to sterilize a healthy young man whose wife has either a severe tuberculosis or heart disease, because at some later date he may wish to remarry and have other children.

Sterilization of women can be rapidly performed in most instances by the vaginal route with but little risk and only a short hospitalization, and with a minimum amount of trauma. If the general condition is severe, this procedure can be accomplished under morphine-scopolamine and local anesthesia in the vast majority of cases. If the vaginal procedure is not possible and laparotomy becomes necessary for tubal resection, sterilization of the man may more definitely be considered. Each case should be considered separately and judged by the age of the couple, the number of children and the financial ability to care for further children.

CHRONIC SINUSITIS AND SULFANILAMIDE

To the Editor:—Please send me whatever information regarding the status of sulfanilamides in the treatment of chronic sinus infections you have. As I am afflicted with an incurable sinus condition, the predominant organisms being *Staphylococcus aureus* and *albus*, I am wondering whether one of the sulfanilamides could be of benefit in this condition.

Charles Kantor, M.D., Summerhaven, Mount Lemmon, Ariz.

ANSWER:—Sulfanilamide and its derivatives have been used with moderate degrees of success in the treatment of acute sinusitis due to beta hemolytic streptococci, pneumococci and staphylococci. In almost all instances, however, some type of drainage has to be used concomitantly with therapy with sulfanilamide or its derivatives. In chronic sinusitis, reports on the use of sulfanilamide or its derivatives have been discouraging. The reason for the failure of sulfanilamide to benefit patients ill with chronic sinusitis probably lies in the fact that reinfection from the nasopharynx and nose is constantly taking place. Hence, while temporary chemotherapeutic effects may be obtained, the cessation of drug therapy is almost always followed by prompt recurrence of the infection in the affected sinus or sinuses.

Medical Examinations and Licensure

COMING EXAMINATIONS

BOARDS OF MEDICAL EXAMINERS

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

Examination of boards of medical examiners and boards of examiners in the basic sciences were published in THE JOURNAL, October 26, page 1478.

NATIONAL BOARD OF MEDICAL EXAMINERS

NATIONAL BOARD OF MEDICAL EXAMINERS: Parts I and II. Various centers, February. Part III. Boston during November. Exec. Sec., Mr. Everett S. Elwood, 225 S. 15th St., Philadelphia.

EXAMINING BOARDS IN SPECIALTIES

AMERICAN BOARD OF ANESTHESIOLOGY: *Written*. Various centers, Feb. 20. Final date for filing application is December 21. *Oral*. Part II. Cleveland, May 31-June 1. Final date for filing application is April 1. Sec., Dr. Paul M. Wood, 745 Fifth Ave., New York.

AMERICAN BOARD OF DERMATOLOGY AND SYPHILOLOGY: *Oral*. Chicago, Dec. 6-7. Applications for Group A are closed. Sec., Dr. C. Guy Lane, 416 Marlboro St., Boston.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written*. Parts I-A and I-B, Feb. 17. Final date for filing application is Jan. 1. Sec., Dr. William S. Middleton, 1301 University Ave., Madison, Wis.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: Part II, Groups A and B, Cleveland, May 28-June 2. Final date for filing application is March 15. Sec., Dr. Paul Titus, 1015 Highland Bldg., Pittsburgh.

AMERICAN BOARD OF OPHTHALMOLOGY: *Oral*. Cleveland, May or June. *Written*. Various centers, March 8. The only written examination during 1941. Applications must be on file not later than Dec. 1. Sec., Dr. John Green, 6830 Waterman Ave., St. Louis.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Oral and written*. New Orleans, January 1941. Final date for filing application is November 15. Sec., Dr. Fremont A. Chandler, 6 N. Michigan Ave., Chicago.

AMERICAN BOARD OF PATHOLOGY: *Oral and Written*. Cleveland, June 1-2. Final date for filing application is May 1. Sec., Dr. F. W. Hartman, Henry Ford Hospital, Detroit.

AMERICAN BOARD OF PEDIATRICS: New York, March 30-31, following the Region I meeting of the American Academy of Pediatrics. Chicago, May 18, following the Region III meeting of the American Academy of Pediatrics. Sec., Dr. C. A. Aldrich, 723 Elm St., Winnetka, Ill.

AMERICAN BOARD OF UROLOGY: *Oral and Written*. All groups. Chicago, Feb. 14-16. Final date for filing application is Nov. 10. Sec. Dr. Gilbert J. Thomas, 1009 Nicollet Ave., Minneapolis.

North Carolina June Report

Dr. W. D. James, secretary, Board of Medical Examiners of North Carolina, reports the written examination for medical licensure held at Raleigh, June 17-21, 1940. The examination covered sixteen subjects and included seventy questions. An average of 80 per cent was required to pass. Sixty-five candidates were examined, all of whom passed. Thirty-four physicians were licensed to practice medicine by reciprocity and nine physicians so licensed by endorsement. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Howard University College of Medicine..(1936)	84.5,	(1939)	90.2,
(1940)	86.8, 89.1, 90.9		
Emory University School of Medicine.....(1940)	88.9,	93	
Rush Medical College.....(1940)	91.3,	92	
University of Chicago, The School of Medicine.....(1940)	91.6		
Tulane University of Louisiana School of Medicine.....(1940)	88.9,		
89.1, 91.6			
Johns Hopkins University School of Medicine.....(1940)	81.9,		
88.6, 91.6			
University of Maryland School of Medicine and College of Physicians and Surgeons.....(1940)	85.2, 88,	88.1,	
88.1, 88.9, 89.7, 90.5, 91.3			
Boston University School of Medicine.....(1939)	88.2		
Harvard Medical School.....(1940)	91.5,	94.3	
Washington University School of Medicine.....(1940)	88,	90.6	
Cornell University Medical College.....(1940)	90.5		
University of Rochester School of Medicine.....(1940)	90.6		
Duke University School of Medicine.....(1938)	87.8,		
88.7, (1940) 83.1, 83.2, 86.8, 86.9, 90.6			
Hahnemann Medical College and Hospital of Philadelphia (1940)	93.6		
Jefferson Medical College of Philadelphia.....(1940)	87.8, 88.3,		
88.7, 91.3, 91.4, 91.7, 92.2, 92.6			
Temple University School of Medicine.....(1940)	86.5,		
87, 88.2, 88.6, 90			
University of Pennsylvania School of Medicine.....(1940)	90.3,		
90.8, 91, 91.5, 92.8			
Medical College of Virginia.....(1939)	88.1, (1940)		
87.9, 91.5, 91.6, 92.1, 92.2			
University of Virginia Department of Medicine.....(1940)	90.1		

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
George Washington University School of Medicine.....(1917)			S. Carolina
Emory University School of Medicine.....(1928), (1936)			Georgia,
(1932) South Carolina			
University of Georgia Medical Department.....(1928)			Georgia
Northwestern University Medical School.....(1925)			Illinois
State University of Iowa College of Medicine.....(1937)			Iowa
University of Louisville School of Medicine.....(1937)			New York
Tulane University of Louisiana School of Medicine.....(1932)			Tennessee
Johns Hopkins University School of Medicine.....(1921)			Maryland
Harvard Medical School.....(1932) Rhode Island, (1936)			New York
Washington University School of Medicine.....(1938)			Missouri

Duke University School of Medicine.....(1933)	Connecticut,
(1935) Ohio	
Jefferson Medical College of .....(1933)	
Temple University School of .....(1933)	
University of Pennsylvania S .....(1933)	
(1936) Pennsylvania	
Meharry Medical College.....(1938, 3), (1939, 3)	Tennessee
University of Tennessee College of Medicine.....(1931)	Tennessee
Vanderbilt .....(1931)	Tennessee
Medical .....(1935)	Tennessee
Universit .....(1933)	Virginia
Universit .....(1913)	W. Virginia
Universit .....(1939)	Virginia
Universit .....(1933)	Alabama

School	LICENSED BY ENDORSEMENT	Year Endorsement Grad. of
Cornell University Medical College.....(1930)	N. B. M. Ex.	
Duke University School of Medicine.....(1934, 2), (1935), (1936, 3), (1937)	N. B. M. Ex.	
University of Wisconsin Medical School.....(1935)	N. B. M. Ex.	

Texas June Report

Dr. T. J. Crowe, secretary, Texas State Board of Medical Examiners, reports the written examination for medical licensure held at San Antonio, June 17-19, 1940. The examination covered twelve subjects and included 120 questions. An average of 75 per cent was required to pass. Two hundred and three candidates were examined, 180 of whom passed and twenty-three failed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Tulane University of Louisiana School of Medicine.....(1940)	81.4, 82.8		81.3,
Harvard Medical School.....(1935)	82.3, (1940)	77.8,	83.5
New York Medical College, Flower and Fifth Avenue Hospitals .....(1940)			79.1
School of Medicine.....(1939)			79.8
Medicine.....(1940)			79.4
School of Medicine.....(1939)			80.6,
University of Tennessee College of Medicine.....(1939)			82
Baylor University College of Medicine.....(1940)			75,
75.2, 75.3, 75.6, 75.8, 75.8, 76.5, 76.5, 77.2, 77.4, 77.6, 77.6, 77.6, 78.2, 78.5, 78.6, 78.7, 78.8, 78.8, 79, 79.1, 79.3, 79.5, 79.7, 79.7, 79.9, 80.1, 80.4, 80.5, 80.5, 80.7, 80.7, 80.8, 81.1, 81.3, 81.3, 81.3, 81.4, 81.5, 81.8, 82, 82.1, 82.3, 82.3, 82.9, 83, 83, 83.1, 83.2, 83.4, 83.5, 83.8, 83.8, 83.9, 84.1, 85, 85.2, 85.3, 85.7, 85.9, 86, 86.4, 86.8			
University of Texas Faculty of Medicine.....(1939)			82.5,
(1940) 75, 76.1, 76.6, 76.9, 77.5, 77.5, 77.6, 77.6, 78, 78.2, 78.5, 78.5, 79, 79, 79, 79.1, 79.1, 79.3, 79.5, 79.5, 79.6, 79.6, 79.8, 79.9, 80.3, 80.4, 80.6, 80.6, 80.6, 80.8, 80.8, 81, 81, 81.2, 81.3, 81.4, 81.5, 81.5, 81.6, 81.8, 82, 82, 82.1, 82.3, 82.3, 82.3, 82.5, 82.6, 82.7, 82.8, 82.8, 82.9, 83, 83, 83.1, 83.2, 83.3, 83.4, 83.5, 83.6, 83.6, 83.6, 83.7, 83.7, 83.8, 84, 84, 84, 84.1, 84.1, 84.2, 84.2, 84.3, 84.5, 84.5, 84.6, 84.8, 85.3, 85.4, 85.6, 86.5, 86.5, 87.8			
University of Texas School of Medicine.....(1938)			80.3
of Medicine.....(1940)			79
Medizinische Fakult.....(1925)			80.2
Osteopaths *77.5, 77.6, 78.1, 79, 79.6,			
79.9, 80, 80.1, ...			6

School	FAILED	Year Grad.	Number Failed
Northwestern University Medical School.....(1940)			1
Washington University School of Medicine.....(1940)			1
Baylor University College of .....(1940, 11)			11
University of Texas Faculty .....940, 4)			4
Magyar Királyi Ferencz .....(1914)			1
Orvostudományi Kara, Szeged.....(1914)			1
Japan Medical College.....(1910)			1
Universidad Nacional Facultad de Medicina, México.....(1937)			1
Osteopaths *(1925)			3

* Examined in medicine and surgery.

Colorado June Report

Dr. Harvey W. Snyder, secretary, Colorado State Board of Medical Examiners, reports the written examination for medical licensure held at Denver, June 12-14, 1940. The examination covered eight subjects and included ninety questions. An average of 75 per cent was required to pass. Fifty-two candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
College of Medical Evangelists.....(1940)	79.3, 81, 81		
University of Southern California Medical School.....(1940)			81
University of Colorado School of Medicine.....(1938) 84, (1940)			78,
78.3, 79.3, 79.5, 79.5, 80, 81, 81, 81, 81, 81, 81, 81.5, 82, 82, 82, 82, 82.3, 83, 83, 83, 83, 83, 83, 83, 83, 83.3, 83.3, 83.5, 83.5, 84, 84.3, 85, 85, 85, 85.3, 87			
Loyola University School of Medicine.....(1939)			84.3
University of Nebraska College of Medicine.....(1940)			79.3
University of Buffalo School of Medicine.....(1939)			85.3
University of Wisconsin Medical School.....(1938)			87

Book Notices

Care of Poliomyelitis. By Jessie L. Stevenson, A.B., R.N., Consultant in Orthopedic Nursing, National Organization for Public Health Nursing. Cloth. Price, \$2.50. Pp. 230, with illustrations. New York: Macmillan Company, 1940.

This book is timely, practical and accurate. It is written by a nurse who has demonstrated mature, discriminating judgment. Miss Stevenson has presented an unbiased evaluation of various conceptions, procedures, maneuvers and methods. The book has grown out of the study, observation and experience of the staff of the orthopedic division of the Visiting Nurse Association of Chicago. It is presented in the hope that it will be useful to others who share in the care of poliomyelitis patients. The manuscript has been read in whole or in part by instructors, supervisors and staff nurses in public health nursing, instructors in physical therapy departments, and directors and members of staffs of state agencies for the care of crippled children. The value of care in handling the acutely ill patient is emphasized. The discussion on postural considerations is excellent. The author has taken meticulous care in describing the simplest details. These include the value of serum, the incomplete or complete arc movement and underwater exercises. The author was careful in choosing her source material and was accurate in quoting and paraphrasing the writings and teachings of her predecessors. The references are valuable. Many personal experiences are interspersed. Dr. Hektoen considers the description of the nature, the virus, the apparent modes of spread, the structural changes, the course of the attack, the treatment of the acute stage and the period of recovery of poliomyelitis to be in full accord with the present understanding and teaching of the disease. The author provides a sound and substantial basis for an intelligent grasp of the principles of the convalescent care, early and late, explained with a mastery of detail. Miss Deming of the National Organization for Public Health Nursing states that "public health nurses will welcome this book. Stevenson is an authority on the subject of orthopedic nursing. The book will be particularly helpful to those public health nurses in the field who are responsible for supervising the care which the family gives the victims of poliomyelitis. Many of the instructions are applicable also to other types of crippling conditions as well as poliomyelitis. The book is full of practical examples of how to administer care and includes many teaching points. It is also very well illustrated. Our home teaching very much needs this type of instruction and guidance. The book, therefore, will be doubly welcome to the supervisors and instructors of public health nurses."

Dermatologic Therapy in General Practice. By Marlon B. Sulzberger, M.D., Assistant Clinical Professor of Dermatology and Syphilology, Skin and Cancer Unit of the New York Post-Graduate Medical School and Hospital of Columbia University, New York, and Jack Wolf, M.D., Attending Dermatologist and Syphilologist, Skin and Cancer Unit of the New York Post-Graduate Medical School and Hospital of Columbia University. Cloth. Price, \$4.50. Pp. 680, with 65 illustrations. Chicago: Year Book Publishers, Inc., 1940.

This work, like most of Sulzberger's "practical utterances," is a painstaking attempt to present to the general practitioner a book on the management of the common skin diseases that the authors "hope will prove useful to the general practitioner." Little mention is made "of many details of morphology or of differential diagnostic finesse." The authors are to be commended for only lightly mentioning roentgen and radium therapy because these agents are used too frequently by "x-ray specialists" and laboratory technicians without proper special diagnostic training. The work describes many practical procedures for the management of skin diseases in greater detail than found in the usual comprehensive textbook, and much material has been taken from previous writings in the Year Book and medical journals and Sulzberger's wide contact with therapy in his own practice and from contact with his preceptors in continental Europe. The details of dermatologic therapy are well presented. In addition to complex therapy, dermatology has a complex diagnostic approach and the reviewer feels that the authors allocate to the average general practitioner a knowledge in properly classifying skin diseases that they do not ordinarily possess. For therapeutic reference

it is essential that they know the entity for which they are prescribing or seeking management advice. The general practitioner who is secure in his diagnosis of a wart or psoriasis will find in this work a number of therapeutic suggestions but will have to decide for himself which treatment to use. The following statement in the section on senile pruritus on page 546 is a highlight of ambiguity: "The condition is usually easily managed, but in some cases proves particularly rebellious to treatment." Chapter XIII, on drug eruptions, is superbly done. Table 14 on page 552, listing common drugs causing eruptions and characteristic forms of eruptions, is excellent and should be of great value to the practitioner in running down drugs as a causal factor in an eruption. This book should prove of great value to the erudite practitioner who has still retained some of his cutaneous diagnostic orientation and desires aid in therapeutic approach and should also be of great value to the novice in dermatology with a restricted therapeutic horizon. It is a valuable practical addition to the dermatologist's library and to that of the general practitioner who desires to treat dermatologic conditions with more armaments than calamine lotion and sulfur and Whitfield ointments. Chapters XV and XVI, on syphilis, are superbly done and should be read and reread by the general practitioner.

Pneumoconiosis Among Mica and Pegmatite Workers. By Waldemar C. Dressen, Passed Assistant Surgeon, United States Public Health Service, and others. From the Division of Industrial Hygiene, National Institute of Health. Prepared by direction of the Surgeon General. Federal Security Agency, U. S. Public Health Service. Public Health Bulletin No. 250. Paper. Price, 15 cents. Pp. 74, with 30 illustrations. Washington, D. C.: Supt. of Doc., Government Printing Office, 1940.

The report includes (1) detailed descriptions of the process of mining and quarrying pegmatite rock, the milling of its major constituents, mica, feldspar and quartz, with a section on hydraulic mining and processing of kaolin; (2) the concentration of atmospheric dusts generated in these different processes; (3) complete medical data obtained from examining fifty-seven men exposed to fine silica-free mica dust, thirty-one men and seventy-eight women fabricators of sheet mica, ninety-five men exposed to kaolin dust, 741 men mining the pegmatite and sorting its chief constituents, and a control group of 245 applicants for work who had had no previous exposure to dust.

For details of this carefully conducted study one must consult the original paper. The chief conclusions of the report were that the inhalation of fine mica dust generated in grinding this material caused a pneumoconiosis demonstrable clinically and by x-ray examination, that the fabrication of sheet mica did not liberate enough dust to produce demonstrable pulmonary changes, that mining pegmatite rock under conditions in which dust was generated in concentrations in excess of ten million particles per cubic foot of air would produce typical silicosis after a sufficient period of exposure and that with higher concentrations of dust the probabilities of developing silicosis in a shorter time were even greater. "No appraisal of the pneumoconiosis-producing potentialities of kaolin can be made at this time on the basis of examinations of ninety-five men exposed to practically pure kaolin dust, because only ten men had been exposed to dust concentrations in excess of ten million particles per cubic foot for as long as ten years." Likewise the influence of feldspar could not be evaluated, as this substance was milled in the same building as the quartz, where men were exposed to dusts of both substances. In such mills 8.3 per cent of the men exposed had developed silicosis, whereas in the mine and quarry group only 2.7 per cent showed evidence of such change. The incidence of associated tuberculosis in the whole group was low. Among the total of 1,243 men and women examined there were only six cases of presumptively active infection (0.48 per cent), and of these two were confirmed by subsequent study. This low incidence closely corresponded with that in nearby counties where no mining was carried on. In this connection there is an interesting discussion of the epidemiologic phases of the problem.

The treatment of the subject is somewhat confusing, owing to the variety of minerals under discussion and the implication that each one of them is capable of producing similar pathologic changes and clinical symptoms. Although one section of the report specifically states that the miners exposed to dust containing quartz develop silicosis while the mica millers, breathing

quartz-free dust, are subject only to pneumoconiosis, nevertheless in other places the term pneumoconiosis is used generically to include silicosis. To the reviewer the Public Health Service's scheme for classifying the x-ray shadows produced by reaction to inhaled dusts is a misdirected attempt at simplification. It includes in a single classification shadow patterns produced by three distinct types of pathologic reaction that are provoked by different kinds of minerals. The scheme implies that any form of pneumoconiosis will progress from linear exaggeration through the granular stage to one of nodulation. Pathologically the benign, nonspecific types of pneumoconiosis that have thus far been studied are characterized by linear deposits of dust about the vascular trunks and interlobular septums, asbestosis by a fine diffuse fibrosis involving the alveolar septums, and silicosis by nodules of fibrosis throughout the parenchyma. There is no tendency for one form to pass over into the other.

The report states that this mica pneumoconiosis whose x-ray manifestations resemble those of asbestosis has not been studied pathologically. Since so little is known about this condition, one wishes that its symptoms and physical signs had been tabulated instead of being dismissed with the statement that they "did not differ in nature or in incidence from the symptoms and signs of silicosis." An appendix details the results of animal injections with the mica, kaolin, feldspar and quartz involved in these industries. Intraperitoneal injections of all but the quartz caused "inert" reactions, a type which they "have interpreted as being potentially harmful and capable of producing a diffuse interstitial pulmonary fibrosis as does asbestos." Personal experience with this and other animal tests raises doubts in the reviewer's mind as to the validity of this generalization. Some feldspars with which he has worked have proved incapable of causing any significant tissue reactions. The micas, on the other hand, seem to be more irritating and cause a limited amount of chronic inflammation, particularly in the case of the black mica biotite. They have not been tested in animals' lungs. It is to be hoped that necropsy material from human beings with prolonged exposures to mica dust may be obtained to furnish a basis for the x-ray manifestations of the pneumoconiosis reported.

Meditsinskaya literatura SSSR. Ukazatel knig i statey zhurnalov i sbornikov 1936. God izdaniya shestoy. [Medical Literature of Russia: Index of Books and Articles, Journals and Pamphlets for 1936. Sixth Year of Issue.] Cloth. Price, 50 rubles. Pp. 754. Moscow & Leningrad: Gosudarstvennoe Izdatelstvo Meditsinskoy Literatury, 1939.

The volume is the Russian index medicus for 1936. It lists only Russian publications. The present is the sixth annual volume. The material is catalogued under subject headings and their subdivisions in alphabetical order. There is an authors' index at the end. The size of the volume speaks well for the literature output. When a 1936 index makes its first appearance in 1939, its value to the clinician and the research worker is somewhat questionable. Just what the advantage is of bringing out an index limited to the Russian literature is not quite clear. Methodology has never been a strong point with the Russians. The reviewer's opinion is that our Russian colleagues could learn much by careful perusal of the *Quarterly Cumulative Index Medicus*.

New and Nonofficial Remedies, 1940. Containing Descriptions of the Articles Which Stand Accepted by the Council on Pharmacy and Chemistry of the American Medical Association on January 1, 1940. Cloth. Price, \$1.50. Pp. 656. Chicago: American Medical Association, 1940.

The most important function of this book, and of the Council on Pharmacy and Chemistry, of whose deliberations it is the result, is to place before the medical profession a description and estimate of new and useful medicinal preparations as they become available. Even after preparations become official, many brands are retained in New and Nonofficial Remedies by the desire of the manufacturers, who appreciate the care given by the Council in acceptance.

The present volume again reflects contemporary advances in chemotherapy by the inclusion of Sulfapyridine, a derivative of Sulfanilamide which was admitted last year; Sobisminol Mass and Sobisminol Solution, new bismuth compounds, the former having been found efficacious in the oral treatment of syphilis; Fuadin, an antimony derivative which has been known for some years but only recently accepted by the Council for use in the

treatment of venereal granuloma and bilharziasis. Other new admissions are Pentothal Sodium, a barbiturate of brief and effective action; Racéphedrine with its hydrochloride and sulfate, which as its name indicates is the racemic form of ephedrine; Mercupurin, Salyrgan and Salyrgan-Theophylline solution, mercurials which are used as diuretics.

A glance at the preface shows that some textual revisions are included in the new volume and that a number of products have been omitted as being off the market or as being in conflict with the Council's rules. Noteworthy revisions are those of the chapter on Liver and Stomach Preparations, radically rewritten and including a statement of requirements suggested by conclusions of the Anti-Anemia Preparations Advisory Board of the U. S. Pharmacopeia; the subsection Tuberculins, entirely rewritten to conform to newer knowledge in this field, and the chapter Allergenic Protein Preparations, the name of which has been changed to Allergenic Preparations. Minor but relatively important revisions are found in the articles Bismuth Compounds, Serums and Vaccines, and Vitamins and Vitamin Preparations for Prophylactic and Therapeutic Use.

The book is recommended for all physicians and for all interested in the uses, production or evaluation of drugs.

Clinical Practice in Infectious Diseases for Students, Practitioners and Medical Officers. By E. H. R. Harries, M.D., M.R.C.P., D.P.H., Medical Superintendent, North-Eastern Hospital (London County Council), London, and M. Miltman, M.D., M.R.C.P., D.P.H., Medical Superintendent, River Hospitals, Orchard Dartford, Kent. With a foreword by W. Allen Daley, M.D., F.R.C.P., D.P.H., Medical Officer of Health, London County Council, London. Cloth. Price, \$6. Pp. 468, with 31 illustrations. Baltimore: William Wood & Company, 1940.

The authors discuss the clinical aspects of the acute infectious diseases based largely on their own experience as clinicians and teachers; they also discuss the modern fever practice as reflected in the work of others. The opening chapters deal with the sources of infection, resistance to infection, laboratory aids and clinical tests in diagnosis, general management and diet. The student should master this part before proceeding to the chapters on the treatment of the individual infectious diseases, including those that are likely to assume great importance under war conditions, such as epidemic typhus, influenza, tetanus, trench fever and Weil's disease. Prophylaxis is emphasized. While the book is an elaboration of notes on clinical lectures delivered to medical students in London, it provides an account of the clinical aspects of infectious diseases in sufficient detail to be a great help to practitioners of medicine and public health officers in the management of these conditions.

Regional Differences in the Hospitalization and Care of Patients with Mental Diseases. By Joseph Zubin and Grace C. Scholz, United States Public Health Service Associated with the Mental Hospital Survey Committee. Federal Security Agency, United States Public Health Service. Division of Sanitary Reports and Statistics. Supplement No. 159 to the Public Health Reports. Paper. Price, 15 cents. Pp. 94. Washington, D. C.: Supt. of Doc., Government Printing Office, 1940.

The 416,784 patients with mental diseases in hospitals occupy more than 50 per cent of all the hospital beds in the United States and account for almost one fifth of the expenditures in all hospitals. There were 328 individuals in every hundred thousand of the general population in mental hospitals during 1935. The rate in New England was 449 per hundred thousand while in the East South Central region it was less than half as much, or only 206.

This difference probably reflects lack of facilities rather than difference in the prevalence of mental disease. Ninety-seven per cent of the patients are diagnosed as "with psychosis." The higher percentage of patients "without psychosis" in some states is due to the lack of facilities for the mentally deficient and the epileptic. Mental diseases are primarily a governmental burden, more than 95 per cent of all patients being cared for in governmentally controlled institutions. In accordance with the change in population age groups, the number of first admissions below 50 years of age is decreasing while above that age it is increasing. For the entire country there is an overcrowding of hospitals for mental diseases of 11.4 per cent, but this rate varies largely, being highest in the Pacific region with 23.6 per cent.

Inadequacy of personnel is even more striking. The American Psychiatric Association sets a standard of one physician to 150 patients. There were in 1935 one physician for 258.6 patients, and in the East South Central district the ratio was 445.6

patients per physician. The nursing situation is nearly as bad. To meet the standard of the American Psychiatric Association of one nurse to eight patients there is a need for 10,500 more nurses. Only 11 per cent of the present nursing staff consists of graduate nurses.

The cost of caring for the mentally diseased is more than \$230,000,000 annually, or an average expenditure of \$534.25 per patient. There is little reason to believe that the geographic differences are as important as the administrative and environmental factors.

Shell Shock in France 1914-18 Based on a War Diary. Kept by Charles S. Myers, C.B.E., F.R.S., Temporary Lieutenant-Colonel, Royal Army Medical Corps. Cloth. Price, \$1.25. Pp. 146. Cambridge: University Press; New York: Macmillan Company, 1940.

During the World War Dr. Charles S. Myers was consulting psychologist to the British armies in France. This book is based on his war diary and deals particularly with cases of shell shock and with reeducation. Apparently many cases of a disturbance still called shell shock are occurring in the present war, amplified indeed by the discovery of new weapons more terrifying than any available in 1918. The volume is of special interest, of course, to British physicians but it also provides much that is interesting and useful to physicians everywhere. It is the mark of an intelligent man to learn by his and others' mistakes. Dr. Myers has found even the recollection of many of the errors of 1914-1918 an exceedingly painful performance.

Archiv und Atlas der normalen und pathologischen Anatomie in typischen Röntgenbildern. Atlas des Röntgenreihenbildes des Brusttraumas auf Grund der Auswertung von über 900000 Röntgenreihenschirmbildern. Zusammenestellt von Hans Holfelder und Friedrich Berner. Fortschritte auf dem Gebiete der Röntgenstrahlen, Ergänzungsband LXI. Herausgegeben von Prof. Dr. Grashey. Paper. Price, 17.50 marks. Pp. 95, with 244 illustrations. Leipzig: Georg Thieme, 1939.

Since the beginning of roentgenology, many attempts have been made to make ordinary photographs of the fluoroscopic screen image. Many difficulties have, until recently, prevented the successful development of this idea. Manoel de Abreu of Rio de Janeiro was probably the first (1936) to make practical application of such a method in a chest survey of large numbers of individuals. The present authors, like de Abreu, have used a 35 mm. camera. A rapid lens and firm mounting of the camera in relation to the screen are prime necessities. The wealth of material represented by a survey of more than 900,000 individuals is exemplified in the atlas. Early tuberculosis was recognized in numerous cases. There is no doubt about the value of miniature camera serial photography of the fluoroscopic screen image as far as concerns case finding or survey studies in pulmonary disease. A special instrument fitted with a magnifying glass serves for rapidly passing the films before the examiner. Such a device is always necessary if one uses such small films. The tendency in the United States is to use a larger film, one about 4 by 5 inches in size, which is still small enough to make real economy in its use and yet large enough to be readily interpreted without enlargement, or at least no greater enlargement than that provided by a simple reading glass.

Pratique médico-chirurgicale. Publiée sous la direction de A. Couvélaire, A. Lémierre, et Ch. Lenormant, professeurs à la Faculté de médecine de Paris. Secrétaire général: André Ravina. Tome X, Deuxième supplément. Third edition. Half-cloth. Price, \$5.25. Pp. 671, with 233 illustrations. Paris: Masson & Cie, 1939.

This volume is the second supplement to an eight volume system of the Practice of Medicine and Surgery published in 1931. The first supplement was published in 1936. A wide range of material in all fields of therapy and diagnosis is covered. An index of the scope of the book is given by a few titles: carotid sinus surgery, ski accidents, sulfonamide drugs, pelvic measurements, surgical treatment of tuberculosis, electroencephalograms, treatment of megacolon, cardiac surgery. The illustrations throughout the book are excellent. The treatment of the subject matter differs somewhat in emphasis from the American literature; for example, there is a longer section on ski accidents than on the sulfonamide drugs. However, there is at least brief mention of the most important changes in medical practice to the date of publication. This book should prove a useful compendium and almanac to any one able to read French.

Behind the Scenes of Murder. By Joseph Catton, M.D., Clinical Professor of Medicine, Stanford University, San Francisco. Cloth. Price, \$3. Pp. 355. New York: W. W. Norton & Company, Inc., 1940.

This volume results from twenty-seven years of practice in psychiatry, which incidentally gave the author opportunity to act as an expert in such famous cases as those of Winnie Ruth Judd, William Hickman and the famous Massie case in Honolulu. Not only does he provide evidence in support of his views from a considerable number of instances of murder in which he acted as either investigator or witness, but also he makes out of medical testimony and his participation an exceedingly dramatic and excellent literary document. One chapter refers to his clash with Clarence Darrow in the Massie case and throws an extraordinary light on the Darrow methods and technic. This is an important contribution to modern scientific criminology and at the same time one of the most interesting works that have been developed in its field.

Le traitement actuel de la tuberculose pulmonaire. Par P. Weiller, assistant à l'Hôpital Beaujon, et S. Katz, assistant libre à l'Hôpital Beaujon. Préface par le Dr Louis Ramond, médecin de l'Hôpital Laënnec. Paper. Price, 90 francs. Pp. 234, with 57 illustrations. Paris: Vigot Frères, 1940.

This well illustrated booklet is written for the general practitioner. The forms and types of tuberculosis are classified according to practical considerations. Factors in diagnosis, including instructive x-ray reproductions and evaluation of laboratory aids, are intelligently discussed. The indications and contraindications for surgical treatment are dwelt on. Sufficient space is devoted to the discussion of chemotherapy, vaccine therapy, dietetic management and change in environment. The problems of smoking, drinking, sex life and marriage are freely discussed. Special chapters are devoted to tuberculosis in the infant and the aged. The style is clear and simple, and the book will be an asset to the library of the general practitioner.

Archiv und Atlas der normalen und pathologischen Anatomie in typischen Röntgenbildern. Differentialdiagnostik der Lungenerkrankungen im Röntgenbilde unter besonderer Berücksichtigung der Queraufnahme. Von Dr. med. habil. O. Simon, Leiter der Röntgen-Abteilung der Medizinischen Universitätsklinik Königsberg i. Pr. Fortschritte auf dem Gebiete der Röntgenstrahlen, Ergänzungsband LVII. Herausgeber: Prof. Dr. Grashey. Paper. Price, 17 marks. Pp. 84, with 204 illustrations. Leipzig: Georg Thieme, 1939.

The first half of the work is devoted to text, the latter half consisting of excellent illustrations. In nearly every instance the author shows the anteroposterior film as well as the lateral, thus facilitating the comparison of the two projections. Any one not already convinced of the value of the lateral film in thoracic roentgenology would do well to study this atlas. It is brimful of interesting cases, some of which would not have been diagnosed except with the aid of the lateral film.

Obesity and Leanness. By Hugo R. Rony, M.D. Cloth. Price, \$3.75. Pp. 300, with 32 illustrations. Philadelphia: Lea & Febiger, 1940.

Here, planned particularly for the general practitioner, is a scientific discussion of obesity and leanness. Many a practitioner today is confronted by representatives of each of these groups anxious to transfer to the other. Scientific control of either obesity or leanness demands a thorough understanding of the physiology and pathology of fat, of the physiology of hunger, and of rest. Dr. Rony inclines to the concept of physiologic bookkeeping with, of course, a recognition of pathologic studies in which the glands have failed to function. The third portion of the book is wholly clinical. It considers indications and contraindications for reduction of weight and also for the use of thyroid glandular material and other methods in controlling and maintaining weight.

A Man Who Found a Country. By Dr. A. Nakashian. Cloth. Price, \$2.75. Pp. 279, with illustrations. New York: Thomas Y. Crowell Company, 1940.

Dr. Nakashian was born in a Turkish town but he is an Armenian. His life reflects first hand the constant difficulties of Armenians with Turks and the place that the American missionaries occupied, particularly in aiding the Armenians. He graduated from the American College in 1887 and decided to take up medicine. He describes how it was necessary to purloin corpses in order to secure material for dissection. Briefly, he became a soldier and learned Arabic. In 1894 he received a

degree in medicine; he then went for further study to Constantinople. Here he began medical practice under difficult conditions. Like many a physician of earlier days he moved toward success by surgery on the governor. After becoming a captain in the Turkish army, being drafted into military service, he became physician to a bandit chief. His story ends with his departure for America. The story is a simple, first hand account of an extraordinary medical career.

Sex Adjustments of Young Men. By Lester A. Kirkendall, Ph.D., Associate Professor of Education, Teachers College of Connecticut, New Britain, Conn. Foreword by Percival M. Symonds. Cloth. Price, \$2. Pp. 215. New York & London: Harper & Brothers, 1940.

The book is the result of twelve years of counseling work with boys and young men. He describes in detail with adequate documentation commonly found forms of sex adjustment among young men, commonly held misconceptions concerning sex and certain histories of actual case histories of difficulties of adjustment among young men. This material is well worth study by psychiatrists working with college students or adolescents. Disappointment with the chapter dealing with desirable sex adjustments will be felt by all psychiatrists engaged in therapy. Among thirteen precepts to be followed are Do not be disturbed by manifestations of sex, Do not toy with sex or put yourself in the way of stimulation, Plan how you will meet difficult situations before they arise and Adopt an attitude that is direct, objective, free from lewdness and obscenity. Perhaps it is too much to hope that a college professor should have a realistic attitude toward life, but surely some inkling of man's terrific struggle against his instincts should by now have permeated to teachers of education.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Hospitals: Liability for Failure to Place Sideboards on Patient's Bed.—Mrs. Potter was admitted to the defendant hospital Thursday, February 16, in a very restless and nervous state. At times she was irrational. A special nurse was employed to attend her during the night and was retained through the following Sunday night, February 19. Sideboards were placed on the patient's bed the first night of her stay in the hospital but were not used thereafter. On Monday the special nurse was dismissed on the advice of the defendant's supervisor of nurses, who thought further employment unnecessary because the patient "apparently was rational and was so much quieter." About midnight Monday a student nurse visited the patient's room and found her "quiet and rational," but on her return about five minutes later she found Mrs. Potter sitting on the edge of the bed with her legs and feet dangling, apparently preparing to leave her bed to go to the bathroom. The patient fell but the nurse caught her by the shoulders. The patient fractured her femur in the fall and two days later died of pneumonia. The surviving husband and children of the patient sued the hospital, contending that her death had been proximately caused by the fall, which in turn was the result of the hospital's negligence in not placing sideboards on the patient's bed the night of the fall. At the close of the evidence the trial court refused to direct a verdict in favor of the hospital and entered judgment for the plaintiffs on the verdict of the jury. The hospital then appealed to the Supreme Court of Idaho.

The theory of the plaintiffs' claim, said the Supreme Court, is that, since sideboards were placed on the patient's bed the first night she was in the hospital and since none were on her bed the night of the fall, the hospital was negligent in not placing sideboards on the bed the latter night and that such negligent omission resulted in her fall and injury. The plaintiffs contended that the patient's condition was such on the night of the fall that the hospital attendants should have known that she might become irrational at any moment or that she might be expected to try to get out of bed. But, answered

the Supreme Court, the uncontradicted testimony of the student nurse is that five minutes before the fall the patient was conscious and was resting quietly. The record shows that the patient had been quiet during the daytime on Monday and there is no evidence to show that the hospital could or should have inferred that the patient on the night of the fall would conduct herself differently from other patients who were "resting quietly." Surely a hospital is not bound to place sideboards on the bed of every patient. One of the defendant's nurse supervisors testified that in her opinion there is no need for the use of sideboards when a patient is in a condition such as Mrs. Potter was in on Monday. Moreover, there was testimony that the use of sideboards for conscious patients may even be bad therapy since such patients can, and often do, crawl over sideboards, and any resulting fall, occurring as it does from a greater height, is likely to have more serious consequences. In the opinion of the court, there was no evidence to show that in not attaching sideboards to the patient's bed the hospital had failed to exercise due care prior to and at the time of her injury. The mere fact that a sideboard was placed on the patient's bed immediately after her fall did not justify an inference that due care required the hospital to put on sideboards before the fall. After the fall the hospital was confronted with a different situation because the patient had become very restless and was in pain. Her condition had changed, and so a different standard of due care may then have been required than was required prior to the fall.

In view of the testimony above, said the court, even under an assumption that Mrs. Potter involuntarily rolled from her bed, the plaintiffs failed to prove negligence on the part of the hospital. But, continued the court, the hospital's defense was even stronger. Even if it be conceded that sideboards would have prevented the patient from involuntarily rolling from her bed, there was positive and uncontradicted testimony that at the time of her fall Mrs. Potter did not involuntarily roll from her bed but rather she was making a conscious and voluntary effort to leave her bed to go to the bathroom. It would seem, therefore, that the patient's fall and injury resulted from her own voluntary and conscious action and not from any negligent act of omission or commission on the part of the hospital.

Since there was no evidence to establish negligence on the part of the hospital, the Supreme Court held that the trial court should have directed a verdict for the hospital, and so it reversed the judgment in favor of the plaintiffs.—*Potter v. Dr. W. H. Groves Latter-Day Saints Hospital (Utah)*, 103 P. (2d) 280.

Dental Practice Act (California): Self-Laudatory Advertising Not Unprofessional Conduct.—The appellant, Webster, who was licensed to practice dentistry in California, ran an advertisement in a newspaper praising the excellence of the "immediate restoration dentures," which he prepared for patients by "The Webster Way." These dentures, so the advertisement stated, were made according to a secret formula from "the newest plate material in dentistry," and they enabled the patient to have a "natural expression" which "defied detection" from any one. The advertisement in general stressed Webster's painstaking care, his skill and his success in this particular field of dentistry. On the ground that by running this advertisement Webster was guilty of unprofessional conduct in that (1) he had advertised professional superiority or the performance of professional services in a superior manner, (2) he had made use of advertising statements of a character tending to deceive the public and (3) he had advertised to guarantee dental services (any of which allegations, if proved, was sufficient cause for revocation of a license to practice dentistry under the California dental practice act), the Board of Dental Examiners suspended his license. Webster appealed to the courts and the matter eventually reached the district court of appeals, fourth district, California.

The question involved in this case, said the district court, is one of ethics, on which professional men have honest differences of opinion. But this court cannot determine ethical questions. It can determine only whether or not there has been a violation of the California dental practice act. In 1935, the California legislature joined other states in a movement to

make dentistry a more dignified and ethical profession and accordingly passed legislation regulating dental advertisements. The law so enacted in California, however, does not prohibit advertising entirely, as was done in some states, but sets up "some standard to regulate a limited form of advertising." There has been a marked tendency in recent years to enact more stringent regulations concerning the practice of law, medicine and dentistry, designed to protect the ignorant, gullible members of the public from quacks and charlatans, who spurn the ethics of their profession and thrive on ornate methods of advertising. However that may be, a statutory proceeding for the revocation of a license is in the nature of a criminal trial in which all intendments are in favor of the accused. In the absence of evidence that there has been violation of the law, the presumption is that the law has been obeyed.

We cannot here, continued the court, analyze each statement in the advertisement complained of. Some of the statements, when separately stated and technically construed, together with the inferences that may be drawn from them, may border on a violation of the dental practice act. However, it must be remembered that the truth of the statements set forth in the advertisement was not challenged by the board of dental examiners. Therefore, it can hardly be maintained (1) that they were of a character tending to deceive or mislead the public or (2) that they advertised a professional superiority or the performance of professional services in a superior manner or (3) that the advertisement was to guarantee any dental service. While we do not wish to condone any attempt to circumvent the spirit and intent of the law and open the field to quacks and charlatans, in view of the fact that disciplinary proceedings are of a criminal nature and that a license to practice dentistry is a property right of which the holder cannot be arbitrarily deprived, we must hold that the board of dental examiners has not met the burden imposed on it to establish by clear and convincing evidence the accused dentist's guilt, which must be done before his license to practice dentistry can be revoked or suspended.

The district court of appeals accordingly directed the board of dental examiners to reinstate the dentist's license to practice.—*Webster v. Board of Dental Examiners of California* (Calif.), 103 P. (2d) 442.

Malpractice: Liability of Hospital Association as Affected by Judgment for Professional Employee.—The plaintiff entered into a contract with the Industrial Hospital Association by which the latter, in consideration of a certain fee to be paid to it monthly, agreed to provide him with hospital, medical and dental services if and when necessary. Later it became necessary to extract one of the plaintiff's wisdom teeth and the Hospital Association directed him to go to Dr. Roberts, a dentist, who extracted the tooth. Infection which followed the extraction was due, the plaintiff alleged, to the dentist's negligence, and he sued both the Hospital Association and the dentist. At the conclusion of the plaintiff's evidence the trial court dismissed the suit as to the Hospital Association and later the jury returned a verdict in favor of the dentist, thereby, as the Supreme Court of Oregon said on appeal, "exonerating him [the dentist] from the charge of negligence." The trial court subsequently ordered a new trial as to the Hospital Association but not as to the dentist, and the Hospital Association appealed to the Supreme Court of Oregon.

The Hospital Association contended that the dentist was an independent contractor and that it had performed its obligations under the contract when it exercised due care in the selection of a dentist to render service to the plaintiff. The plaintiff contended that the dentist was an agent of the association and that the association was responsible for the dentist's negligence. Assuming, said the Supreme Court of Oregon, that the doctrine of respondent superior applies, we are of the opinion that the verdict exonerating the dentist from the charge of negligence precludes recovery against the principal, the Hospital Association. The Hospital Association and the dentist were not joint tort-feasors. There was no independent act of negligence charged against the Hospital Association. If it is liable it can be so only by reason of the negligence of its agent, the dentist. When the judgment was rendered in favor of the dentist—from

which there has been no appeal by the plaintiff—the foundation of any case against the association was destroyed. If the case were to be retried it would be incumbent on the plaintiff to show negligence on the part of the dentist, and that matter has been adjudicated adversely to the plaintiff's contention. The court then quoted from 2 American Jurisprudence 361, reading in part as follows:

... where the tortious liability of the principal is based solely upon the act of his agent with whom he is being sued, a verdict in favor of the agent necessarily amounts to a finding that the principal also is not liable.

The Supreme Court accordingly reversed the order of the trial court granting a new trial as to the Hospital Association and ordered the trial court to reinstate the judgment of dismissal as to the association.—*Feazle v. Industrial Hospital Ass'n* (Ore.), 103 P. (2d) 300.

Dental Practice Acts: Statutory Restrictions on Advertising Upheld.—The dental practice act of Kentucky, enacted in 1938, provides that the state board of dental examiners may revoke a dentist's license for "unprofessional conduct." Certain activities are specified in the act as constituting "unprofessional conduct," among which is "advertising credit or terms of credit" extended by the practitioner to his patients. The plaintiff, a practicing dentist in Kentucky, filed a petition for a declaratory judgment to determine the validity of this provision in the dental practice act prohibiting "advertising credit or terms of credit." He contended that the prohibition against such advertising violated his constitutional rights under the state and federal constitutions. From a judgment sustaining the demurrer of the state board of dental examiners the plaintiff appealed to the Court of Appeals of Kentucky.

It was conceded, said the Court of Appeals, that the profession of dentistry and its practice are subject to the police power of the state and that the exercise of that power must be reasonable. Therefore, the only question before the court was whether or not the provision of the Kentucky dental practice act in question, which was enacted under the police power, reasonably affected or promoted public health, morals, safety or general welfare. In the opinion of the court it did. All dentists as well as physicians and members of other professions are not of equal capacity and the selection of the particular professional man to treat or represent the individual may, under the police power of the state, be regulated by considerations other than those purely economical. Persons of modest financial means and persons suffering from bodily ills are frequently not in a position to judge competently between the ability of different practitioners. Clearly, then, it was within the province of the exercise of the police power for the legislature to forbid any attempt to influence the public generally in the selection of a dentist through the medium of advertisements of credit and credit terms. The court was unable to differentiate between the damaging effects of advertising through paid agents and advertising by any other means through which patients, who perhaps would not have come but for the advertisement, are drawn to the office of the advertiser. The validity, said the court, of statutes prohibiting members of the dental profession from advertising for patrons in any form has been questioned frequently, but in every such instance the constitutionality of the statute has been upheld. While the court was unable to find a prior court decision involving a statute which specifically prohibited "advertisement of credit and terms of credit," in its judgment the same principles of law announced in the cases relating to prohibition of advertising in general by professional persons were applicable to the instant case, because "advertising credit or terms of credit" is nothing more nor less than an effort by which the practitioner seeks to bring patrons to his office through the advertised inducement of credit, on enticing and satisfactory terms.

The whole structure of the law in upholding legislation regulating the practice of members of any branch of the medical profession is based on the theory that a practitioner should not engage in any conduct smacking of quackery but should let his work prove and establish his worth, instead of "blowing his own horn" in an effort to bring about that establishment. Patients should seek the physician or dentist because of his capability, and not the physician or dentist obtain patients through their gullibility. The purpose of the legislature in

enacting the provision in question was, in effect, to prevent undue solicitation by dentists based on a financial appeal and to maintain a proper dignity and standard of professional practice in dentistry. These were clearly matters looking to the promotion of public health and general welfare. The authority so exercised by the legislature was the quintessence of police power, and no occasion speaks louder for its exercise and application than the proper regulation of those engaged in the delicate task of tinkering with the human body.

Accordingly, the judgment of the lower court upholding the constitutionality of the Kentucky dental practice act was affirmed. —*Reynolds v. Walz et al. (Ky.)*, 128 S. W. (2d) 734.

Privileged Communications: Medical Report to Insurer; Cross-Examination of Witness.—An Oklahoma statute provides that the following persons shall be incompetent to testify:

A physician or surgeon concerning any communication made to him by his patient with reference to any physical or supposed physical disease, or any knowledge obtained by a personal examination of any such patient: *Provided, that if a person offer himself as a witness, that is to be deemed a consent to the examination.*

In an action by the plaintiff, the insured, to recover sick benefits under an insurance policy, which covered appendicitis but not salpingitis, "a disease peculiar to women," the Supreme Court of Oklahoma held that the lower court had not erred when it refused to permit the defendant insurance company to introduce in evidence, through the insured's attending physician whom it had called as a witness, a preliminary report of the plaintiff's illness, which report had been furnished to the insurer by the attending physician without the plaintiff's knowledge or consent. This medical report included a statement that in addition to acute appendicitis the patient had bilateral salpingitis, which information was obtained by the attending physician during the course of his professional attendance on the plaintiff. In the opinion of the court this statement in the report was privileged under the privileged communications statute, and the privilege was not waived by the submission of the report to the insurance company as proof of the plaintiff's illness. Furthermore, in the judgment of the court, this privilege was not waived by the plaintiff when at the trial she testified, on cross-examination by the defendant's counsel, concerning her health in general. When a plaintiff, continued the court, offers herself as a witness in an action to recover for sick benefits under an insurance policy but does not voluntarily testify specifically or generally as to the cause of her illness, or the condition of her health prior thereto, she neither by offering herself as a witness nor by any averment in her petition waives her privilege under the privileged communications statute against the disclosure by her physician of any knowledge with reference to any physical or supposed physical disease which he obtained by personal examination of her. As is provided in the statute, the privilege may be waived only in the event that the patient offers herself as a witness and testifies "on the same subject." Merely answering questions as to treatments received by her physician, in response to questions on cross-examination, was not voluntary testimony on the part of the plaintiff and did not waive the privilege guaranteed by the statute. Accordingly, the judgment in favor of the plaintiff was affirmed. —*Massachusetts Bonding & Ins. Co. v. Jones (Okla.)*, 94 P. (2d) 885.

Malpractice: Liability of Physician for Infection of Eyeball Following Surgical Removal of Cyst of Eyelid.—The plaintiff engaged the defendant, a physician but not a specialist in diseases of the eye, to remove a cyst from the "underside of her upper eyelid." He advised her that this could be done by a slight operation without causing pain or affecting her sight and that she would be cured in a short time. He everted the eyelid, made an incision and scraped out the cystic material with a curet. He then applied hydrogen peroxide and a 5 per cent solution of mild protein silver, placed a bandage over the eye and instructed the patient not to touch the bandage or her eye, to prevent infection. Thereafter he treated her daily for almost two weeks and then made arrangements for another physician to take over the case so that he might attend a physicians' meeting out of town. Up to the time he left he

repeatedly assured the plaintiff that her eye was "doing nicely" and was not infected. At the trial, however, he admitted that three or four days prior to his departure he had observed a white cloudy circular ring in the iris of the plaintiff's eye "around the outer portion, which gradually grew cloudy and continued cloudy." The day after the defendant left, the plaintiff called the physician who was to take the defendant's place during his absence. He found the "entire eyeball completely inflamed," refused to treat it and sent the plaintiff to an eye specialist. In spite of treatments for a few days the condition of the plaintiff's eye became worse and the eyeball had to be removed. The plaintiff later brought suit against the defendant physician for malpractice. From a judgment in favor of the plaintiff the physician appealed to the court of appeals of Tennessee, middle section.

The defendant contended that the judgment was not supported by the evidence and that the trial court had erred in not directing a verdict in his favor. He further contended that the infection of the plaintiff's eyeball was the result of syphilis which she had contracted in 1931 and which had become arrested following her discontinuance of treatment before a cure had been effected. However, a Wassermann test for syphilis, taken during the course of the treatment of her eye, was negative. There was no evidence, said the court of appeals, that the defendant injured the plaintiff's eyeball in operating on her eyelid, and there was no evidence as to the cause of the inflammation of the eyeball. So far as the record showed, the plaintiff's eyeball may have become infected by her own fault in adjusting the bandages or in rubbing her eye, or it may have resulted from an "abscess caused by syphilis." But, continued the court, the lower court would not have been warranted in directing a verdict for the defendant on the proposition that he had exercised due care and skill in treating the plaintiff's eye after the operation on her eyelid. The defendant admitted that before he had turned the case over to the second physician he had observed a white ring "around the outer portion" of the iris which gradually became cloudy and remained cloudy. Both the other two physicians who attended the plaintiff were of the opinion that her eyeball had been infected for several days prior to the time of the defendant's departure from town. In the judgment of the court, the defendant evidently did not know or was negligent in not observing the infection when he assured the plaintiff that her eye was "doing nicely." It was therefore a question for the jury's determination whether or not the defendant in treating the eye subsequent to the operation had possessed and exercised that reasonable learning, skill and experience ordinarily possessed and exercised by members of the medical profession in good standing under similar circumstances. The court could find no reason to disturb the jury's finding that he had not. Accordingly, the judgment in favor of the plaintiff was affirmed. —*Glover v. Burke (Tenn.)*, 133 S. W. (2d) 611.

Society Proceedings

COMING MEETINGS

- American Academy of Pediatrics, Memphis, Tenn., Nov. 18-20. Dr. Clifford G. Grulce, 636 Church Street, Evanston, Ill., Secretary.
- American Society of Anesthetists, New York, Dec. 12. Dr. Paul M. Wood, 745 Fifth Ave., New York, Secretary.
- American Society of Tropical Medicine, Louisville, Ky., Nov. 12-15. Dr. E. Harold Hinman, Malaria Control Division, Wilson Dam, Ala., Secretary.
- Pacific Coast Society of Obstetrics and Gynecology, San Francisco, Nov. 6-9. Dr. T. Floyd Bell, 400 Twenty-Ninth St., Oakland, Calif., Secretary.
- Puerto Rico, Medical Association of, San Juan, Dec. 13-15. Dr. David E. Garcia, P. O. Box 3866, Santurce, Secretary.
- Radiological Society of North America, Cleveland, Dec. 2-6. Dr. Donald S. Childs, 607 Medical Arts Bldg., Syracuse, N. Y., Secretary.
- Society of American Bacteriologists, St. Louis, Dec. 27-29. Dr. I. L. Baldwin, Agricultural Hall, University of Wisconsin, Madison, Wis., Secretary.
- Southern Medical Association, Louisville, Ky., Nov. 12-15. Mr. C. P. Loran, Empire Bldg., Birmingham, Ala., Secretary.
- Southern Surgical Association, Hot Springs, Va., Dec. 10-12. Dr. E. Alton Ochsnor, 1430 Tulane Ave., New Orleans, Secretary.
- Southwestern Medical Association, Tucson, Ariz., Nov. 21-23. Dr. M. P. Spearman, 1001 First National Bank Bldg., El Paso, Texas, Secretary.
- Western Surgical Association, Topeka, Kan., Dec. 6-7. Dr. Albert H. Montgomery, 122 South Michigan Blvd., Chicago, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

Alabama State Medical Assn. Journal, Montgomery

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- Skin Grafting and Reconstructive Surgery. C. J. Thuss, Birmingham.—p. 77.
- Maternal Mortality in Southern States: Factors Involved in Cause and Prevention of Increased Rate. E. D. Colvin, Atlanta, Ga.—p. 84.
- Surgical Management of Ureteral Stones. E. B. Frazer, Mobile.—p. 94.
- Treatment of So-Called Colitis with Sulfanilamide. J. W. Britton, Anniston.—p. 97.
- Treatment of Acute State of Myocardial Infarction: Contraindications to Use of Morphine. T. K. Lewis, Birmingham.—p. 99.

American Heart Journal, St. Louis

20:261-388 (Sept.) 1940

- Characteristics of Chest Lead Electrocardiograms of 100 Normal Adults. D. Deeds and Arlie R. Barnes, Rochester, Minn.—p. 261.
- Phonocardiographic Studies of Early Rheumatic Mitral Disease. A. C. Taquini, Buenos Aires, Argentina; B. F. Massell and B. J. Walsh, Boston.—p. 295.
- Response to Renin of Unanesthetized Normal and Nephrectomized Rats. A. Freedman, Cincinnati.—p. 304.
- Use of "Exercise Tests" in Connection with Venous Pressure Measurements for Detection of Venous Obstruction in Upper and Lower Extremities: Preliminary Report. J. R. Veal and H. H. Hussey, Washington, D. C.—p. 308.
- Galvanometric Potentials of Extremities and of Thorax in Congenital Dextrocardia. C. E. Kossman, New York.—p. 322.
- Toxicity of Digitalis and Ouabain in Animals Under Sodium Thiopentalbarbital and Sodium Pentobarbital Anesthesia. C. M. Gruber, V. G. Haury and M. E. Drake, Philadelphia.—p. 329.
- *Incidence of Syphilitic Aortitis in Representative Municipal Hospital. A. Gelperin, Cincinnati.—p. 340.
- Cardiovascular System in Pulmonary Tuberculosis. J. A. Sweeney, Philadelphia.—p. 345.

Incidence of Syphilitic Aortitis.—Gelperin studied the records of the 7,683 necropsies performed between 1926 and 1937 at the Cincinnati General Hospital. Microscopic evidence of syphilitic aortitis (excluding all developmental complications) was found in 700, or 9.1 per cent of the total. Variations in the incidence of syphilitic aortitis in necropsy groups depend on differences in the social status of the source population and on the number of Negroes who are included. Approximately 8 per cent of the white and 25 per cent of the Negro patients in a hospital caring for the indigent sick will have syphilis. By applying these percentages to the necropsy records studied by him the author finds that such a calculation shows that there should be 1,132 patients with syphilis (14.6 per cent). Since not all patients with syphilis have syphilitic aortitis, and estimations of its incidence vary from 50 to 90 per cent, an average figure of 70 per cent should give 792 cases of syphilitic aortitis, or 10.3 per cent. This predicted percentage is comparable to the actual incidence, which was 9.1 per cent. At least 1,200 patients with syphilitic aortitis are admitted to the Cincinnati General Hospital each year. The diagnosis of syphilitic aortitis therefore should merit more practical consideration than it has received. The problem might be solved by a better application of the knowledge of the pathologic changes of syphilis. Except during the relatively short early mucocutaneous infectious and late visceral stages, syphilis in its latent period is not moribund but smoldering and is slowly but surely destroying irreplaceable vital tissue. It is impossible to predict in whom it will develop and who will escape the disastrous developmental complications of syphilitic aortitis. Therefore it is suggested that "probable syphilitic aortitis" be added to each diagnosis of late latent syphilis in which previous treatment has been inadequate.

American Journal of Hygiene, Baltimore

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Section B

- Host Range of Equine Encephalomyelitis: Susceptibility of North American Cottontail Rabbit, Jack Rabbit, Field Vole, Woodchuck and Opossum to Experimental Infection. J. T. Sylverson and G. P. Berry, Rochester, N. Y.—p. 19.
- *Immune Reactions of Carriers and Noncarriers of Type Specific Pneumococci: Bacteriologic and Immunologic Study of Hospital Contacts. M. Finland, J. W. Brown and Mildred W. Barnes, Boston.—p. 24.
- Comparative Susceptibility of Different Strains of Mice to Rabies Virus. H. N. Johnson and C. N. Leach, Montgomery, Ala.—p. 38.
- Canine Rabies Vaccination: Experimental Study of Efficacy of Single Subcutaneous Injection Method with Phenol Treated Vaccine. C. N. Leach and H. N. Johnson, Montgomery, Ala.—p. 46.

Section C

- Human Intestinal Protozoa in Mexico. R. Hegner, E. Beltrán and R. Hewitt, Mexico City, Mexico.—p. 27.
- *Study of Birds and Mosquitoes as Hosts for Virus of Eastern Equine Encephalomyelitis. W. A. Davis, Boston.—p. 45.

Section D

- Studies on Schistosome Dermatitis: VII. Seasonal Incidence of Cercaria Stagnicola Talbot, 1936, in Relation to Life Cycle of Its Snail Host, Stagnicola Emarginata Angulata (Sowerby). W. W. Cort, D. B. McMullen, L. Olivier and S. Brackett.—p. 33.
- Occurrence of Adult Hookworms, Ancylostoma Caninum, in Lungs of Experimentally Infected Dog. G. F. Otto and Naomi Jaffe Schugam, Baltimore.—p. 70.
- Transmission of Immunity to Trichinella Spiralis from Infected Animals to Their Offspring. Evelyn Abrams Mauss.—p. 75.

Immune Reactions of Pneumococcus Carriers and Non-carriers.—Finland and his associates carried out bacteriologic and immunologic studies on 126 interns, nurses, attendants, technicians and clinical clerks whose duties necessitated varying degrees of contact with pneumonia patients at the Boston City Hospital, where from 500 to 800 patients with pneumococcal pneumonia are treated each year. Bacteriologic studies were directed mainly to the isolation and identification of pneumococci from swabs from the tonsillar fossae and posterior pharyngeal wall. Pneumococci were identified on one or more occasions in seventy-one (56 per cent) of the 126 subjects. The percentage of carriers found appeared to be more or less proportional to the number of cultures made. Most of the patients who had pneumococci in their throat at the time of the first culture also had them in later cultures. These pneumococci were usually of the same type. Pharyngeal cultures were made of eighty-seven subjects either while they were having symptoms of acute respiratory infections or within a week after their subsidence. Pneumococci were found with about equal frequency in these cultures and in those when the subjects were free from respiratory infections. The distribution of types of pneumococci was similar in a general way to that found in most epidemiologic studies. Certain types of pneumococci, notably types I, VII, VIII, XIII, XVII and XXI, were more frequent than is usual among normal persons. Antibodies for homologous types were found frequently in carriers at the time when pneumococci were isolated. In a considerable number of the subjects the pneumococci were cultured before the corresponding antibodies were first demonstrated in the blood. In others, antibodies were present before the organisms were found in the pharynx. In many instances, antibodies persisted regardless of whether the carrier state continued or the organisms were no longer found. The association of antibodies in the serum with the finding of pneumococci in the pharynx was by no means constant in the transient or the chronic carriers. While it was difficult to trace direct exposures of carriers to patients infected with the same pneumococcus, there was indirect evidence of exposure to patients by some of the carriers of the less frequent types. More often the evidence pointed to exposure of the various carriers to one another rather than to patients. Pneumonia developed in four of the interns in the course of the study. These were not classic cases of lobar pneumonia and they do not shed much light on the relation of the immune mechanism to the inception of pneumococcal pneumonia. Two of the subjects were previously shown to be chronic pneumococcus carriers. The same type of pneumococci was found during the disease as was found previously and there was no significant change in the antibody status. The pneumonia of the other two interns was presumably transmitted from one to the other. In one a few type XVIII pneumococci were found during his illness; they were probably

incidental and their antigenicity could not be demonstrated. No pneumococci could be isolated from the cultures of the other intern during his infection, although he previously was a transient carrier of type XVII pneumococci. The predominant organism found during the acute illness of these two subjects was a slightly hemolytic streptococcus which was not fully identified. Their illness resembled that of atypical pneumonia, described recently as acute interstitial pneumonitis and sometimes loosely called "virus pneumonia" although a definite virus etiology has not been established. In none of the interns who had pneumonia did significant antibodies develop either to the pneumococcus which was found or to most of the common types associated with pneumonia. The observations lend further support to the antigenicity of type specific pneumococci in apparently healthy carriers, and those in the subjects in whom pneumonia developed indicate that pneumococci found in patients with atypical pneumonias may not be etiologically related to the infection.

Birds and Mosquitoes as Hosts for Encephalomyelitis Virus.—Davis investigated which mosquitoes native to Massachusetts were capable of transmitting eastern equine encephalomyelitis. Sixteen species of mosquitoes native to Massachusetts, including all the commoner members of the forty Culicinae known to the state, were obtained for study. In addition, *Aedes aegypti* was used as a control because it was already known to be a vector. The author also determined whether mosquitoes could become infected by feeding on wild birds, which may thus serve as a reservoir for the virus. He found that of the seventeen species of mosquitoes studied five (*Aedes vexans*, *Aedes sollicitans*, *Aedes cantator*, *Aedes atropalpus* and *Aedes triseriatus*) and a laboratory strain (*Aedes aegypti*) could transmit the virus of eastern equine encephalomyelitis from infected birds or mammals to other animals. No transmissions were obtained with the *Culex*, *Mansonia* and *Anopheles* genera of mosquitoes. Most mosquitoes of the genus *Aedes* probably can serve as vectors of the virus in the laboratory, but ecologic factors determine the importance of the different species in nature. If mosquitoes are the natural vectors of equine encephalomyelitis, *Aedes vexans* was probably the most important vector of the infection in the New England epidemic of 1938. Experimental evidence showed that birds (English sparrows, pigeons and cowbirds) could be infected with virus by the bite of infected mosquitoes and that such birds may serve as a source from which mosquitoes become infected. The results do not prove that birds are the natural reservoir of equine encephalomyelitis, but it is likely that mosquitoes which become infected with virus from such birds in turn infect horses, human beings, birds or other animals.

American Journal of Surgery, New York

49:401-600 (Sept.) 1940

- Further Observations on Treatment of Bursitis of Shoulder. R. L. Patterson Jr. and R. H. Patterson, New York.—p. 403.
Method for Protecting Skin in "Windowed" Unpadded Casts. H. D. Cogswell and C. A. Thomas, Tucson, Ariz.—p. 409.
Newer Venereal Diseases: Their Association and Confusion with Neoplastic Disease. R. B. Greenblatt, Augusta, Ga.—p. 411.
Management of Breech Position. S. S. Rosenfeld, New York.—p. 420.
Rupture of Pregnant Uterus. H. S. Acken Jr., Brooklyn.—p. 423.
Carcinoma of Breast. F. G. Hidde, J. P. Malec and J. W. Gale, Madison, Wis.—p. 427.
Surgical Treatment of Gastrointestinal Hemorrhage. L. K. Stalker, Rochester, N. Y., and H. K. Gray, Rochester, Minn.—p. 434.
Operation for Repair of Diastasis Recti Abdominis. S. A. Romano, New Orleans.—p. 439.
Acute Appendicitis in Diabetes Mellitus. A. Neiman, Chicago.—p. 443.
*Surgical Treatment of Acute Cholecystitis. H. K. Bonn and C. A. Bachhuber, Los Angeles.—p. 447.
*Meckel's Diverticulum. W. W. Noel, Detroit.—p. 454.
*Technic for Anal Repair. Chelsea Eaton, Oakland, Calif.—p. 464.
Arteriosclerotic Gangrene: Major Clinical Problem. L. N. Atlas, Cleveland.—p. 467.
Adrenal Glands and Malignancy. B. Sokoloff and I. Arons, New York.—p. 471.
*Study of Sixty Cases of Tetanus. J. A. Kirtley Jr., Nashville, Tenn.—p. 480.
Local Asphyxia and Tumors. F. M. Allen, New York.—p. 484.
Spasmodic Torticollis: Its Cause and Treatment. J. T. Rugh, Philadelphia.—p. 490.
Surgery in Syphilitic Women. A. Philip, New York.—p. 496.

Surgical Treatment of Acute Cholecystitis.—From 1933 to 1938, 955 patients were admitted to the Los Angeles County Hospital with the diagnosis of biliary disease. Bonn and Bachhuber studied their records in an attempt to determine

whether the elapsed time from the onset of an acute cholecystitis to operation had any influence on complications and mortality. The criterion was the pathologic diagnosis rather than the surgeon's operative report. The policy of the hospital has been to defer surgical intervention until the acute attack has subsided, subject to the indications for emergency operations at the discretion of the attending surgeons. The patient has been ill usually from two to seven days before entering the hospital. In the entire group of 955 cases there were 704 surgical interventions. Acute cholecystitis was diagnosed in 251 instances. Six cases had to be excluded because of insufficient data, leaving 245. None of this group were operated on and fifteen died. Nine necropsies were done, and in all but two instances the cause of death was other than acute cholecystitis or its complications. All necropsies showed the presence of a cholecystitis. As 230 of the 245 patients who were not operated on apparently recovered and were dismissed from the hospital in from five to fourteen days, there is presumptive evidence that the incidence of perforation, gangrene and abscess may not be as high as some observers report. The patients operated on have been divided into three groups: 1. Operation was performed within forty-eight hours of onset on sixteen patients; eight cholecystectomies and eight cholecystostomies, with three deaths, a mortality of 19 per cent. 2. Sixty-four patients were operated on from forty-eight hours to the seventh day after onset. There were five deaths, a mortality of 8 per cent. Forty-eight cholecystectomies were done with four deaths, and sixteen cholecystostomies were done with one death. 3. There were 427 operations performed after the sixth day of onset. The greater portion of this group were operated on from the fourteenth to the twenty-first day after onset, the majority on the fourteenth day. There were twenty-three deaths, a mortality of 5.4 per cent. Twenty deaths occurred among the 390 cholecystectomies performed and three deaths followed the thirty-seven cholecystostomies. The authors conclude that operation within forty-eight hours of onset carried too high a mortality to warrant much consideration, especially in the wards of charitable hospitals, whose patients are frequently poor surgical risks and who often do not come to the hospital within forty-eight hours of the acute onset. Therefore any early operation, preferably cholecystectomy, should be done within six to twelve hours of onset. The peak of the disease is probably reached in from one to four days. In group 2 the mortality had dropped by 60 per cent, from the 19 per cent of group 1 to 7.8 per cent in group 2. In group 3 evidence of acute active pathologic changes in the gallbladder was found in 130 of the 427 patients in whom the condition had supposedly subsided. The majority of the 130 patients showed minimal clinical manifestations when operated on. Yet the mortality dropped from 19 per cent in group 1 and 7.8 per cent in group 2 to 5.4 per cent in group 3. Nine deaths in group 3 were due to accidental injuries of ducts and blood vessels; if these deaths were eliminated the mortality would be 3.5 per cent. The frequent occurrence of acute pathologic changes in groups 2 (twenty-nine instances) and 3 does much to influence the authors' belief that no absolute time can be set as to the opportune moment to operate. Therefore each case should be conducted on a knowledge of Touroff's pertinent facts and be sharply individualized. Except for those cases of perforation and gangrene which may apparently occur at any time, the mortality percentage will probably be lowest when operation is done about fourteen days after onset.

Meckel's Diverticulum.—According to Noel, twenty-five cases of Meckel's diverticulum were encountered in 12,000 intra-abdominal operations performed at the Henry Ford Hospital during the last thirteen years. Seventeen of these occurred between the ages of 20 and 50 years. The extremes of life were a baby aged 14 weeks and a man aged 77. There were fifteen male and ten female patients; all were of the white race. The diverticula vary markedly in size, shape, position and structure. The majority were approximately the size of a thumb. Their position in relation to the ileocecal valve varied from 2 inches to 3 feet from the cecum. The majority of the diverticula lay free except for their attachment to the ileum. Thirteen of the patients presented no symptoms referable to the diverticulum. These patients were operated on for other conditions

and the diverticulum was an incidental finding. In the other twelve patients the symptoms depended on the pathologic involvement of the diverticulum. Six were associated with symptoms of intestinal obstruction, two suggested appendicitis, one bled from the umbilicus and three from the intestine. The preoperative impression was correct in only three cases. Treatment is always surgical intervention. The pathologic process resulting as a complication of the diverticulum must be given first attention, but the diverticulum should usually be removed. The diverticula reported were seen by seven different surgeons and treatment was of five different types. The technic for excision of the diverticulum is usually that used for the appendix. Resection of the intestine and inversion should be carried out only for special indications. Meckel's diverticulum should be looked for if the lesion found at operation is insufficient to account for the preoperative symptoms and signs. Two patients died: the 77 year old patient three days after operation and a woman of 56 from intestinal obstruction associated with a strangulated hernia. Only twenty of the twenty-five patients had any form of treatment directed to the diverticulum, giving a mortality rate of 10 per cent. The prognosis is good for complete recovery after the diverticulum is removed. Although the follow-up has been inadequate, none of the patients have returned for treatment for any cause associated with the diverticulum.

Tetanus.—Kirtley presents data on fifty-two cases of tetanus in the Vanderbilt University Hospital and eight cases in St. Thomas Hospital observed during the last fourteen years. There were thirty-two patients whose symptoms appeared within ten days after the initial injury (early tetanus) and twenty-eight whose symptoms occurred after more than ten days (late tetanus). The mortality among the early cases was 71.8 per cent and among the late cases 17.8 per cent. Puncture wounds of the extremities by nails, splinters, thorns and rake prongs were the commonest agents of injury. Lacerated wounds were the next most frequent. The mortality rate shows little change from year to year. During the first seven years of the study it was 45.8 per cent among twenty-four cases and in the last seven years 47.2 per cent among thirty-six cases. Three of the sixty patients received prophylactic injections of at least 1,500 units of antitoxin within twenty-four hours of the initial injury. Two of these patients died and one recovered. It is generally assumed that prophylactic antitoxin will prevent tetanus, but from 5 to 10 per cent of the patients with tetanus have had prophylactic antitoxin. The strongest evidence for prophylaxis is the 0.117 per cent of tetanus among more than two million wounded British soldiers who had received antitoxin. The debriding and irrigating of many of these war wounds may have also been a big factor in lowering its incidence. The incidence of tetanus has steadily decreased with each war as medical care and prophylaxis have improved. Comparable figures for tetanus in civil life are not available. The importance of incising the site of infection and removing all foreign material has been urged by many investigators. In the author's series some surgical procedure was instituted in seven cases with one death. Twenty-seven of the fifty-three patients whose wounds did not receive any surgical treatment died. The importance of wound care is again emphasized in the one patient who would have been expected to die but who recovered. This boy of 10 years cut his leg on a piece of glass and the wound was sutured at once. Three days later trismus and convulsions developed. The wound was reopened and irrigated, and wet dressings were applied. The child had a high temperature, tachycardia and all the unfavorable prognostic signs but recovered. The fact that failure to drain a localized infection containing tetanus bacilli may result in a fatality in spite of long incubation and survival periods and more than 200,000 units of antitoxin is shown by the following: A boy of 17 years injured his hand with a blank cartridge and a week later mild tetanus developed and he entered the hospital. Despite large daily doses of antitoxin he became progressively worse and died sixteen days after admission. Necropsy showed a palmar abscess containing powder granules, pus and tetanus spores. Twenty of the twenty-eight patients who died had wounds so located that incision or excision could have been done. Half of them died within twenty-four hours

after admission, making it questionable whether any measure would have been of benefit. The other ten patients lived from two to sixteen days. It would seem desirable to incise the infected wound and convert it into an open wound in which anaerobiosis would be discouraged if not prevented. If further toxin formation can be prevented after hospitalization and the free, unfixed toxin neutralized, some of the patients who live four or five days may be saved. Antitoxin is best administered by the intravenous and intramuscular routes. The amount given seems to make little difference in mortality. Deaths were slightly less in the group receiving from 25,000 to 50,000 units in the first forty-eight hours. More than 43 per cent of the patients who died received more than 50,000 units within a few hours after admission. Avertin with amylene hydrate was given only those patients who had clonic convulsions; half recovered and half died. Phenol intravenously was given to seven patients, with two deaths. The two who died had short incubation periods, while those recovering had incubation periods of more than ten days. One patient with an incubation period of sixteen days received phenol alone and recovered.

Am. J. Syphilis, Gonorrhea and Ven. Dis., St. Louis 24:537-670 (Sept.) 1940

- Occurrence of Positive Serologic Tests for Syphilis in Animals Other Than Man: Review of Literature. J. E. Kemp, Elsie Mae Fitzgerald and Mildred Shepherd, Chicago.—p. 537.
- Aneurysm of Pulmonary Arteries. W. B. Allan and J. P. McCracken, Baltimore.—p. 563.
- *Prognosis in Syphilitic Aortic Insufficiency: Evaluation of Factors Other Than Antisyphilitic Treatment. R. H. Kampmeier, Nashville, Tenn., and S. R. Combs, Terre Haute, Ind.—p. 578.
- The Problem of Syphilitic Psychoses. E. Wexberg, New Orleans.—p. 590.
- Sulfamethylthiazole and Sulfathiazole Therapy of Gonococcal Infections. J. F. Mahoney, R. R. Wolcott and C. J. Van Slyke, Staten Island, N. Y.—p. 613.
- Treatment of Chancroid with Sulfanilamide. O. S. Culp, Baltimore.—p. 622.
- Dependability of Skin Test in Diagnosis of Lymphogranuloma Venereum and Chancroid, Especially in the Colored Race. R. Brandt and R. Torpin, Augusta, Ga.—p. 632.
- Cisternal Puncture: Survey of Reactions Following 1,246 Punctures. G. V. Kulehar, San Francisco.—p. 643.
- Incidence of Cytoplasmic Inclusion Bodies in Vaginal Smears. Jean Broadhurst, Ruth Ewing, Marguerite LeMoyné and Estelle MacLean, New York.—p. 651.

Prognosis in Syphilitic Aortic Insufficiency.—Kampmeier and Combs studied the records of 163 patients with syphilitic aortic insufficiency in order to determine the part anti-syphilitic treatment played in prolonging life. They also analyzed the relationship of congestive heart failure, free aortic regurgitation, sex and manual labor to longevity. Serologic tests for syphilis were positive in 139 cases and negative in twenty-three. Nineteen showed collateral evidence of syphilis and four presented no such evidence. Fifty-four and six tenths per cent died within the first three years after onset of symptoms and 19 per cent after three years; 11 per cent lived less than three years and 15.4 per cent survived this period. Practically all the patients were in the fifth decade of life. Of the group who died twelve, or 10 per cent, lived an average of 89.2 months and seventeen, or 39.5 per cent, of the living group survived an average of 112.8 months. The latter group had experienced symptoms for only about eleven months before coming under observation, whereas the former had symptoms for twice as long. The distribution of the dead and the living patients with relationship to race, sex and duration of life indicates that manual labor accelerates the progress of syphilitic aortic disease; 39 per cent of the patients who died within three years of the onset of symptoms were laborers and only 22 per cent of those who survived longer than three years were laborers. Two thirds of the ninety-one Negro men died within three years, fifteen died within a period of from thirty-seven to 138 months and only nine were alive from thirty-seven to 168 months after the onset of symptoms. Less than one half of the white men and Negro women died within three years, and about one fifth were alive from thirty-seven to 168 months after the onset of symptoms. There were only eight white women, but only two of these died within three years and one half were still alive from thirty-seven to 168 months after the onset of symptoms. Of those who died within three years 80 per cent were men, whereas after this

period men accounted for 67.7 per cent of the deaths. The aortic lesion was a chance finding among only twenty-five of the patients. Only fourteen of the 163 patients had had adequate treatment (at least eight injections of an arsenical plus twelve or more injections of heavy metal compounds or twenty-four or more injections of heavy metal compounds) in the past. Following the diagnosis of syphilitic aortic insufficiency only four of eighty-nine patients dying within three years and four of thirty-one dying in from thirty-seven to 138 months had received adequate treatment. Two of the latter group were women and lived seven and eleven years respectively. Likewise twelve of eighteen patients alive up to thirty-six months and twelve of twenty-five alive from thirty-seven to 168 months had received adequate treatment. Of the forty-three living patients eighteen were women, and one half of the twenty-four adequately treated patients were women. The data for the patients who died after twelve months from the onset of symptoms (others are not included) show that those who received inadequate treatment lived for 36.2 months as compared with 60.3 months for the adequately treated group. The duration of life of adequately treated Negro men was about equal to that of inadequately treated Negro women. Inadequately treated white men lived an average of 40 per cent longer than inadequately treated Negro men. Of twenty-two patients alive more than twelve months after the onset of symptoms, twenty-two have had adequate treatment and have lived on an average of 60.3 months. The seventeen who were inadequately treated have lived a total average of 80.6 months. Therefore the study does not indicate that adequate antisyphilitic treatment has a favorable influence on the prognosis of syphilitic aortic insufficiency. Of the 120 patients who died, twenty-nine died of other than a cause related to the heart.

Annals of Otol., Rhin. and Laryngology, St. Louis

49:577-864 (Sept.) 1940

- Allergy of Upper and Lower Respiratory Tracts in Children. F. K. Hansel, St. Louis.—p. 579.
- Study of Mortality Records Over Ten Year Period. F. T. Hill, Waterville, Maine.—p. 628.
- *Use of Human Convalescent Scarlet Fever Serum in Streptococcal Infections Involving Ear, Nose and Throat. P. Viole, Los Angeles.—p. 639.
- Pathology of Subepithelial (Reinke's) Layer of Vocal Cords. R. Waldapfel, Grand Junction, Colo.—p. 647.
- Laryngocele Ventricularis. J. R. Lindsay, Chicago.—p. 661.
- Survey of Relation Between Nutrition and the Ear. G. Selfridge, San Francisco.—p. 674.
- Carcinomatosis of Nasal Mucous Membrane (Fatal Hemorrhage After Puncture of Maxillary Sinus). H. Brunner and J. W. Wall, Chicago.—p. 688.
- Partial Saddle Nose: Simplified Technic Without Use of Implant or Transplant. M. M. Wolfe, Philadelphia.—p. 700.
- Sulfathiazole Used with Cartilage Implants for Repair of Facial Defects. J. H. Childrey, San Francisco.—p. 709.
- *Osteomyelitis of Frontal Bone: Report of Thirteen Cases. A. C. Jones, Boise, Idaho.—p. 713.
- Selection of Treatment for Cancer of Larynx. H. E. Martin, New York.—p. 728.
- Cavernous Sinus Thrombosis: Report of Three Cases with Autopsy Findings. H. W. Rubin and A. Cutler, Brooklyn.—p. 736.
- Temporoparietal Brain Abscess with Operation and Recovery. W. L. McDougall, Atlanta, Ga.—p. 744.
- Roentgen Therapy for Acute Sinusitis. H. L. Williams and W. C. Popp, Rochester, Minn.—p. 749.
- Effect of X-Radiation on Tonsillar Tissue. C. I. Johnson, R. S. Palmer and L. A. Vance, Boston.—p. 755.

Convalescent Scarlet Fever Serum.—Viole used human convalescent scarlet fever serum for thirty-seven patients with streptococcal infection of the ear, nose or throat. Some of these were complications of scarlet fever or scarlatina. Of sixteen persons having otitis media and mastoiditis, nine required mastoidectomies. In four cases in which the serum was administered there was an immediate drop in temperature and lessening of the toxic symptoms with rapid, uneventful recovery. In seven the convalescence was slower but far better than might have been expected had the serum not been administered. The results were debatable in only four, as no demonstrable changes could be attributed to the serum. Only one of these sixteen patients died in spite of an injection of scarlet fever serum, which seemed to have no effect. Necropsy revealed that death was due to an acute streptococcal septicemia. Eight of the thirty-seven patients received sulfanilamide in addition to the serum. It made little

if any difference in the course of the disease and the patient's recovery. However, in the presence of a grave illness neither should be denied if indicated. There were five cases of streptococcal meningitis secondary to mastoiditis in which surgical intervention was performed. Two of these patients improved immediately after receiving the serum, although one had been receiving sulfanilamide without much effect. Convalescence was uneventful and the results were excellent. A third patient showed some immediate improvement but a large abscess developed in the left buttock at the site of the intramuscular injection of the serum. Her progress was retarded until the abscess was opened and drained. The two remaining patients of this group received sulfanilamide in addition to serum. One made an uneventful recovery. The other improved slowly, but four days after she had been discharged from the hospital a diagnosis of scarlet fever was made. The value of the serum may be considered questionable. Another patient immediately after mastoidectomy on the left side with ligation of the jugular vein received 40 cc. of scarlet fever serum and his temperature dropped to normal, where it remained for four days, when it rose suddenly to 105 F. The mastoid wound was reopened but no pathologic change was found. Two subsequent injections of serum, 20 and 40 cc. respectively, failed to elicit any response and the patient died. There were four cases of laryngotracheobronchitis and three of streptococcal pharyngitis. Three tracheotomies were performed. The rate of recovery and definite signs of improvement were much slower in three patients who were given sulfanilamide in addition to the serum. The others who received only serum, except one on whom a tracheotomy had been performed, improved immediately. The author states that the most dramatic improvement following serum occurred among five cases of streptococcal sore throat, definitely placing streptococcal sore throat among the curable diseases. In the series there was a retropharyngeal abscess with complicating cervical adenitis, toxic anemia, Ludwig's angina and otitis media. In spite of injections of serum this patient's progress was slow until the abscess was opened and drained, when the convalescence was rapid and uneventful. This emphasizes the benefits of early treatment. One instance of beginning peritonsillar abscess responded well to scarlet fever serum and the patient improved without surgical intervention. On the other hand its value in a case of cervical adenitis was questionable. The patient also received sulfanilamide and, though her convalescence was uneventful, it was decidedly slow. There was only one reaction to the serum. This patient had a long history of allergy to various things and entered the hospital with asthma, cervical adenitis and pneumonia complicating scarlet fever. Urticaria developed after 40 cc. of the scarlet fever serum, and no more, was given. After adequate doses of sulfanilamide she recovered. Human convalescent scarlet fever serum produces no foreign protein reactions and sensitizations as does animal serum, and such reactions as may occur are easily controlled.

Frontal Bone Osteomyelitis.—Jones reports thirteen cases of osteomyelitis of the frontal bone and emphasizes the necessity for early diagnosis. He stresses the fact that swelling, edema and pain over the frontal sinus are of more value than a roentgenogram, as the infection is existent from seven to ten days before there can be x-ray evidence of it. Two of the author's cases followed injury and were not connected with sinus infection, four presented intracranial involvement and seven did not. He does not think that any definite operative procedure can be followed in these cases. It is not necessary to block off and remove a whole area of the frontal bone because the diploic spaces are tortuous. The operative procedure which he uses follows along the diploic spaces. The incision should be sufficiently large to uncover a large amount of bone for inspection, and bone removal should extend laterally far enough to reach the outer limit of the frontal sinuses. He has secured good results by more conservative incisions than that from eyebrow to eyebrow and splitting up the middle of the forehead. He has used the hairline incision as brought out by Furstenberg with almost no visible scarring, being careful to preserve the periosteum. With plenty of assistance in elevating the scalp, an excellent view can be obtained of the questionable area. This incision also leaves little scarring. The end results in his cases

indicate that the enormous disfigurement caused by keeping the flaps separated during the healing is not necessary. He concludes from a rather incomplete survey of the literature and his observations that generalized osteomyelitis is often inexcusably overlooked.

Archives of Ophthalmology, Chicago

24:627-866 (Oct.) 1940

- After Half a Century of Cataract Extraction. C. B. Meding, New York.—p. 627.
- Tubercle Within Central Retinal Vein: Hemorrhagic Glaucoma; Periphlebitis Retinalis in Other Eye. F. H. Verhoeff, Boston, and G. V. Simpson, Washington, D. C.—p. 645.
- Grenz Rays and Their Application in Ophthalmology: I. Their Properties of Penetration. P. Dethmers and P. H. Boshoff, Leiden, Netherlands.—p. 656.
- Value of Tryparsamide in Treatment of Atrophy of Optic Nerve Due to Syphilis. H. Sutherland-Campbell, Los Angeles.—p. 670.
- Intracellular Bodies of Conjunctival Epithelial Cells. A. Braley, Detroit.—p. 681.
- Hypertelorism. M. L. Berliner and S. Gartner, New York.—p. 691.
- *Clinical Studies of Vitamin A Deficiency: Biophotometer and Adaptometer (Hecht) Studies on Normal Adults and on Persons in Whom an Attempt Was Made to Produce Vitamin A Deficiency. Bertha L. Isaacs, F. T. Jung and A. C. Ivy, Chicago.—p. 698.
- Fundamental Differences Between Crossed Cylinder and Line Chart Astigmatic Tests. J. I. Pascal, New York.—p. 722.
- Orbital Apex and Sphenoid Fissure Syndrome. Helen Holt, Chicago, and A. de Rötth, Spokane, Wash.—p. 731.
- *Unusual Changes in Retinal Veins in Diabetes. C. S. O'Brien and J. H. Allen, Iowa City.—p. 742.
- Ocular Pharmacology of Furfuryl Trimethyl Ammonium Iodide, with Special Reference to Intra-Ocular Tension. A. Myerson and W. Thau, Boston.—p. 758.
- Effect of Iontophoresis on Eye, with Special Reference to Intra-Ocular Tension. W. Thau and A. Myerson, Boston.—p. 761.
- Choroidal "Perithelioma" Simulating Retrobulbar Neuritis: Report of Case. B. Friedman, New York.—p. 765.
- Encanthion Trachomatosa. E. Oláh, Gyula, Hungary.—p. 772.
- Results Achieved by Orthoptic Training in Correction of Strabismus. Clara Burri, Chicago.—p. 784.
- Lines on Bulbus Beneath the Conjunctiva. E. Oláh, Gyula, Hungary.—p. 792.
- Allergic Phenomena in Ophthalmology. A. Appelbaum, New York.—p. 803.

Vitamin A Intake and Biophotometer Readings.—Isaacs and her associates examined 143 healthy medical students in an endeavor to correlate their vitamin A intake with their biophotometer readings. Twenty of the subjects had ten consecutive daily readings in order to determine their day to day variations and the variations between different persons. The authors present the results of their attempts to produce a disturbance of vitamin A absorption and dark adaptation by giving large doses of liquid petrolatum to twenty-eight students (using twenty-nine others as controls), a disturbance of dark adaptation by a vitamin A deficient diet in three students and the response of patients to vitamin A. The biophotometer readings of the twenty students chosen for intensive study and of the other 123 tested showed frequent wide daily variations and also that a subject might appear deficient one day and normal on all ensuing days. In the experiment in which 5 cc. of liquid petrolatum per kilogram of body weight for as long as 131 days was used to impair vitamin A absorption the biophotometer did not detect any correlation between the dietary vitamin A of these or of normal subjects, their biophotometer performance and possibly presumptive clinical signs of hypovitaminosis A. Supplements of oil concentrates providing for several months 200,000 units of vitamin A and 2,700 units of vitamin D daily produced no apparent change in any of the subjects. The three subjects who lived on a diet containing not more than 74 U. S. P. units of vitamin A for forty-three, forty-nine and forty-nine days, respectively, failed to show more than a suggestion that their stores of vitamin A were being depleted as determined by dark adaptation levels. Subjective symptoms suggestive of a possible temporary hypovitaminosis were reported on the fourteenth and sixteenth day respectively by two of the subjects. The results are interpreted to indicate failure to produce definite evidence of deficiency after forty-nine days of a diet containing 74 units of vitamin A. The authors believe that their subjects must either have had large stores of vitamin A, were unsusceptible or that it takes a long time to manifest definite evidence of deficiency. In view of their results and the fact that several observers have reported a probable general vitamin A deficiency amounting in some areas to as high as 52 per cent, it occurs to them that (1) the average American diet may be deficient

in available vitamin A or its precursors, (2) the standard of vitamin A intake on which subjects are judged to be deficient is questionable and (3) the procedures being used for measurement are recording something other than vitamin A deficiency. They incline toward a combination of the latter two possibilities. It is their opinion that subjective factors involved in the determinations of all types of visual tests should be recognized and an attempt be made to control them when measurements of dark adaptation levels are made; also that significance should not be attached to minor fluctuations in dark adaptation in terms of vitamin A deficiency unless statistical methods are used to test the reliability and validity of the differences.

Retinal Veins in Diabetes.—Ophthalmoscopic examinations of several hundred diabetic patients, according to O'Brien and Allen, have revealed many with typical retinitis. Almost invariably sclerosis of the retinal vessels was in evidence and occasionally varices of the retinal veins were observed. These venous changes occurred almost exclusively in patients with diabetes and arteriosclerosis, but occasionally they were present in those with arteriosclerosis alone. Most frequently the varices were found in those with poorly controlled, long-standing diabetes. From the literature, in which eight cases are reported, it appears that varicosities of the retinal veins are rare and apparently occur almost exclusively in adults with poorly controlled diabetes and arteriosclerosis. The authors cite twenty-one patients from 36 to 65 years of age having diabetes with retinitis and retinal varices, who showed symptoms of diabetes for from two to twenty-five years, with an average of ten years. The diabetes was poorly controlled in every instance. The systolic blood pressure ranged from 108 to 240 mm. of mercury and the diastolic pressure from 65 to 110 mm. On physical examination nineteen of the twenty-one patients were found to have generalized arteriosclerosis and five showed nephrosclerosis. Nine patients had enlargement of the heart and five had coronary disease. Other complicating conditions (gangrene, ulcers, edema) were encountered. The vision of sixteen patients was diminished. In every case the retinal vessels were sclerosed and hemorrhages were seen in the retina. In all but one, small sharply margined, yellowish white areas of retinal degeneration were present. Woolly areas of cytoid degeneration were observed in fifteen patients, proliferating retinitis was seen in one or both eyes of nine patients and hemorrhages in the vitreous were present at some time in three. All these patients showed varicosities, most frequently in the larger retinal veins. They did not appear to have any relation to arteriovenous crossings. In some eyes the varices alone gave evidence of venous changes, but in others a white line along either side of the vessel gave proof of sclerosis. Frequently the affected vein showed constrictions of the lumen alternating with varices, thus giving a beaded or sausage-like appearance. In five cases venous thrombosis was present in either the central vein or one of its branches. Under the microscope the veins of an eye with secondary glaucoma removed from one of these patients appeared sclerosed, the wall showing variations in thickness, hyaline degeneration, endothelial proliferation and thromboses. Varices in the retinal vessels were observed in considerably less than 1 per cent of patients with diabetic retinitis. Retinitis of diabetes is not perhaps the best term for the condition and retinosis is suggested.

California and Western Medicine, San Francisco

53:105-152 (Sept.) 1940

- Interpretation of Laboratory Examinations in Diagnosis of Infectious Diseases: Part I. C. S. Keefer, Boston.—p. 111.
- The Middle Road in Obstetrics and Gynecology. J. N. Ewer, Oakland.—p. 114.
- Pneumonia in Children: Treatment with Sulfapyridine. E. E. Moody and E. G. Knopf, Los Angeles.—p. 116.
- Polypoid Bronchial Tumors, with Special Reference to Bronchial Adenomas. A. Goldman, San Francisco.—p. 123.

Connecticut State Medical Journal, Hartford

4:501-584 (Sept.) 1940

- Organization of Medical Services for the Care of Civilians Injured in Air Attacks. E. Hoff, Oxford, England.—p. 501.
- Health for Pupils and Teachers. I. V. Hiscock, New Haven.—p. 509.
- Medical Preparedness in Connecticut. C. Barker, New Haven.—p. 513.
- Recent Advances in Chemotherapy. J. Millett, Hempstead, N. Y.—p. 515.

Journal of Lab. and Clinical Medicine, St. Louis

25:1235-1358 (Sept.) 1940

- *Sulfapyridine: Studies on Absorption and Excretion. J. M. Kinsman, J. W. Moore and M. M. Harrison, Louisville, Ky.—p. 1235.
- Studies of Sulfanilamide in Blood and Urine of Rabbits Infected with Beta Hemolytic Streptococci. L. Hansen and W. A. Kreidler, Philadelphia.—p. 1246.
- Calorigenic Action of Ammonium Salts in the Human Subject. R. C. Herrin, Madison, Wis.—p. 1259.
- Toxic Effects of Sulfanilamide on Tissues of Rats. H. A. Davis, L. C. Harris and H. C. Schmeisser, Memphis, Tenn.—p. 1263.
- Accuracy of Diagnosis of Appendicitis. A. S. Arkush and A. A. Kosky, Santa Monica, Calif.—p. 1276.
- Stability of Ascorbic Acid in Blood. L. D. Greenberg and J. F. Rinehart, San Francisco.—p. 1288.
- *Treatment of Acute Attacks of Bronchial Asthma by Intravenous Injection of Aminophylline. H. A. Carr, New York.—p. 1295.
- Note on Determination of Total Serum Proteins, Serum Albumin and Serum Globulin. Ida Kraus, Chicago.—p. 1300.
- Simple Aid in Making Blood Smear. B. Sills, Mexico City, Mexico.—p. 1302.
- Evaluation of Methods for Determining Blood and Urinary Amylase. D. L. Dozzi, Philadelphia.—p. 1303.
- Rapid Diagnosis of Malaria from Thick Blood Smears. G. Castro, Panama, Republic of Panama.—p. 1308.
- Determination of pH Values of Biologic Fluids: II. Influence of Temperature, Dilution and Type of Diluent on pH Values of Bacteriologic Mediums. A. Glaubiger, New York.—p. 1311.
- Procedure for Routine Determination of Vitamin B₁ in Urine. J. W. Ferrebee and G. A. Carden, New York.—p. 1320.
- Measurement of Cell Volume of Blood by Cell Opacity Method. A. T. Shohl, Boston.—p. 1325.

Absorption and Excretion of Sulfapyridine.—Kinsman and his co-workers have given sulfapyridine to 131 patients. The concentration of the drug in the blood, its absorption and its elimination have been studied in forty-six cases (thirty-eight of pneumonia, one of empyema, one of gonococcal arthritis, one of typhoid and five of Streptococcus viridans endocarditis). The drug was administered orally. Absorption was erratic, the height of the absorption curve was unpredictable from identical doses and from patient to patient, and there was no correlation between the size of the dose and the height of the blood concentration curve. Generally the blood concentration was higher following a dose of 2 than of 4 Gm. About 60 per cent of the patients vomited. Vomiting was more frequent after an initial dose of 4 than of 2 Gm. Therefore the routine employment of an initial dose of 2 Gm. is recommended. The cause of the vomiting was not clarified but the authors feel that it is of central and not of gastric origin. It is not due to an increased concentration of the acetylated form of the drug, for among the patients who vomited this form of the drug was much lower than in the ones who did not vomit. Acetylation or conjugation of the drug occurred rapidly; about 35 per cent of it being acetylated within the first hour. Throughout the course of administration about 33 per cent of acetylation is present, although it varies from 0 to 100 per cent. During elimination acetylation is much greater than at any other time. No evidence was found that the degree of acetylation bears any relation to the total concentration of the drug in the blood. After the drug is withdrawn it is at first eliminated rapidly, then more slowly, so that as long as five days later appreciable quantities can still be found in the blood and urine. The free form is eliminated more rapidly than the acetylated form. The drug disappears from the urine at about the same time as from the blood. Quantitative determinations show that from 21 to 56 per cent of the drug can be recovered from the urine, the average being 30 per cent. The authors conclude that, in order to ensure the maximal recovery rate, frequent blood concentration studies should be made of every patient with pneumonia (103 of their whole series had pneumonia, six of them died) and if the patient does not seem to be doing well and the blood concentration is below 6 mg. per hundred cubic centimeters the drug or its sodium salt should be administered parenterally. Only 40 per cent of the patients with bacteremia recovered with a blood concentration less than 6 mg. per hundred cubic centimeters, whereas under the same conditions 70 per cent of patients with a negative blood culture recovered.

Aminophylline for Bronchial Asthma.—From July 1938 to May 1939, according to Carr, forty-one patients with acute bronchial asthma were treated at Bellevue Hospital. Twenty-two of these were refractory to epinephrine and their acute

attacks were treated by intravenous injections of aminophylline. The aminophylline was given undiluted, 0.48 Gm. in 2 cc. of aqueous solution. The entire amount was administered intravenously within two minutes. About a third of the patients showed one or more of the following symptoms: dizziness, nausea, retching, vomiting, "pounding of the head," "burning in chest and head" or head and chest pain. No alarming effects were observed, and neither did striking or permanent effects of pulse or blood pressure ensue. The duration of disease varied from one to twenty years. Half of the patients obtained immediate relief. The effect in others was evident in from five to thirty minutes. The duration of benefit was from one hour to the absence of a recurrence over a period of days. It was never necessary to give more than one injection within a period of less than two hours. The effectiveness of epinephrine may have been restored in view of the fact that half of the patients required only one injection, were subsequently discharged and apparently did not have another refractory attack. Eight of the twelve patients who received intravenous injections of aqueous solution of aminophylline for acute asthma without a history of its previous use obtained immediate and striking relief, and four obtained relief within ten minutes. Minor toxic symptoms occurred among one third of the patients. All stated that they experienced greater relief than that given by epinephrine during previous acute attacks. Eight patients who had been given epinephrine by the ambulance surgeon or admitting physician were all benefited when aminophylline was given from twenty-five minutes to twenty-four hours later. Three had immediate relief and the others obtained relief in from twenty to fifty minutes. Three had minor toxic symptoms. Two patients had asthma of an allergic type, and these two responded less favorably.

Journal-Lancet, Minneapolis

60:379-432 (Sept.) 1940

- Nature of Various Mill Dust Allergens. F. W. Wittich, Minneapolis.—p. 418.
- Capsella Bursa Pastoris as Hemostatic After Prostatectomy. A. J. Greenberger and M. E. Greenberger, New York.—p. 422.

Journal of Urology, Baltimore

44:247-388 (Sept.) 1940

- Stenosis of Ureteropelvic Junction: Congenital and Acquired. H. J. Jewett, Baltimore.—p. 247.
- Malignant Papillary Cystadenoma of Kidney: Case Report. W. G. Hayward, Jamestown, N. Y.—p. 259.
- Tests for Leakage in Early Diagnosis of Ruptured Bladder: Use of Cystometrograph. H. M. Weyrauch Jr. and R. A. Petery, San Francisco.—p. 264.
- Vesico-Appendical Fistulas. J. deJ. Pemberton, T. L. Pool and J. M. Miller, Rochester, Minn.—p. 274.
- Suprapubic Transvesical Repair of Vesicovaginal Fistulas. I. J. Farsh, Minneapolis.—p. 279.
- Interstitial Cystitis: Report of Case with Necropsy. J. Schwartz and D. Kastoff, New York.—p. 301.
- Tumors of Penis. W. J. Carson, Milwaukee.—p. 307.
- Malignant Mixed Tumor of Spermatoc Cord (Lipo-Osteofibrosarcoma). M. L. Dreyfuss and S. Lubash, New York.—p. 314.
- Ectopic Testis: Report of Case of Bilateral Ectopia Testis Pelvicis and Its Surgical Correction. R. W. Hunt, New York.—p. 325.
- *Embryoma of Testis: Report of Case and Classification of Neoplasms of Testis. M. M. Melicow, New York.—p. 333.
- *Studies in Malignant Testis Tumors: II. Syndrome of Choriogenic Gynecomastia: Report of Six Cases and Review of 121. J. B. Gilbert, Schenectady, N. Y.—p. 345.
- Leukoplakia of Urinary Tract: Report of Unusual Case of Leukoplakia of Ureter. V. C. Laughlin and J. F. L. Bilotta, Cleveland.—p. 358.
- *Treatment of Gonorrhea with Sulfathiazole. O. S. Culp, Baltimore.—p. 367.
- Complications from Sulfanilamide Therapy of Urinary Tract Infections. R. J. Prentiss and R. H. Flocks, Iowa City.—p. 377.
- Experimental Study of Anesthetic and Analgesic Properties of Pyridium. J. H. Morrissey and A. N. Spinelli, New York.—p. 381.
- New Ureterostomy and Urethral Catheter Retainer. J. H. Winer, Staten Island, N. Y.—p. 386.

Embryoma of Testis.—Melicow reports an embryoma of the testis the microscopic picture of which he interprets on the basis of pathologic embryology. The patient, 28 years of age, presented a hard, painless, nontransilluminating mass in the right side of the scrotum. The condition had been present for four months. The Aschheim-Zondek test was strongly positive. A right orchidectomy was performed. The immediate recovery was uneventful, but the Aschheim-Zondek test

remained strongly positive. Bilateral gynecomastia and pulmonary metastases developed and caused hemoptysis. The patient died three months after the operation. The gross specimen presented areas of hemorrhage and necrosis within a relatively solid grayish pink tumor. Scattered among dense collections of variegated cells were a number of simple ring-like structures composed of ovoid cells characterized by an inner cell mass. The latter resembled the blastula stage of mammalian embryos. A count of the embryo-like buds in any one slide, when compared with the size of the specimen, indicates that the tumor probably contained millions of such structures. The blastula stage was seen often. In a few embryonic buds there was a suggestion of the formation of the notochord and splitting of the mesoderm to form the celomic cavity. Masses of syncytial cells resembling the chorionic epithelium seen in pregnancy were irregularly distributed throughout the specimen. This observation, plus the intense chorionic gonadotropic reaction and the gynecomastia, the author believes, support the conclusion that the tumor dealt with is one containing numerous embryos of varying stages of development. The blastulas were the youngest ever seen in the human being.

Malignant Testis Tumors and Gynecomastia.—Gilbert cites six cases of malignant testis tumors associated with gynecomastia and data on 129 cases from the literature. The study includes clinical examination for sperm in two cases, and differential qualitative determination of gonadotropic hormone output on hypophysectomized rats. The four other unpublished reports are personal communications. He divides the total of 135 cases of gynecomastia into two groups. Group 1 includes 103 cases associated with teratoid tumors. There were fifty-four primary testicular tumors, seven so-called extragenital chorionepitheliomas, eleven apparently misdiagnosed chorionepitheliomas and thirty-one teratoid tumors with a clinical course strongly suggesting the presence of chorionepitheliomatous elements. Group 2 comprises twenty cases which were eliminated from discussion in the group of true choriogenic tumors with gynecomastia. The mammary stimulation was nonfunctional and not related to the testis tumor. The characteristics of the syndrome of choriogenic gynecomastia with testis tumors consist of (1) chorionepithelioma in the primary or metastatic tumor, (2) gynecomastia, usually bilateral, with glandular tissue hyperplasia, often the only symptom present, (3) enlargement and/or hyperpigmentation of the areolae, (4) physiologic activity manifested by either gross or microscopic secretion in the breasts, (5) high titers of choriogonadotropic hormones and the presence of estrogen, (6) histologic changes in the pituitary gland described generally as "pregnancy cells" and (7) hyperplasia of the prostate and/or seminal vesicles.

Sulfathiazole Treatment of Gonorrhea.—Culp used sulfathiazole in the treatment of thirty-eight male patients with gonococcal urethritis. Twenty-one of these have been followed regularly since the drug was discontinued and seventeen of them have had no recurrence to date and appear to be cured. There were two frank failures and one recurrence. Anemia developed in one patient and he was unable to tolerate sulfathiazole. Six of the seventeen apparent cures were of patients with both anterior and posterior urethritis, some of which had further complicating manifestations of gonorrhea. Two of the cured patients had failed to improve on sulfanilamide. Most of the patients received 1 Gm. of sulfathiazole every six hours for an average of 9.3 days. The discharge disappeared on an average of 2.7 days in those patients in whom it was limited to the anterior urethra and on an average of 5.2 days when complications were present. Eight of the thirty-eight patients appeared to be well but failed to return after sulfathiazole was discontinued. The dosage and duration of their treatment was about the same as in the well followed cases. Urethral discharges disappeared on an average of 2.8 days, and all the patients were free from gonococci when last seen. The remaining nine patients have had disappearance of their discharge and their urethral cultures are negative, but they are still taking the drug. Six of these had posterior involvement and three involvement limited to the anterior urethra. In the latter group the discharge disappeared in two days and in the com-

plicated cases the duration of exudate averaged 4.7 days. Only two instances of toxicity (one of anemia and one of leukopenia) were encountered, although the blood and urine of every patient were analyzed frequently. The best results were obtained with those patients who received 1 Gm. of sulfathiazole every six hours until the voided urine was free from shreds. To avoid urolithiasis and leukopenia the fluid intake was intentionally not reduced. The blood level of sulfathiazole only once reached 4 mg. per hundred cubic centimeters. Generally it was between 2.5 and 3.5. A higher blood concentration of the drug does not appear necessary and limitation of fluids should be avoided. Sulfathiazole apparently is of great value in the treatment of acute gonorrhea (posterior and anterior) and it compares favorably with other sulfonamide derivatives.

Medical Bull. of Veterans' Adm., Washington, D. C. 17:111-214 (Oct.) 1940

Biopsy of Sternal Marrow and Its Place in Clinical Hematology. H. C. Manauagh.—p. 111.

Valvular Heart Disease in Pulmonary Tuberculosis. H. K. Stinson.—p. 122.

*Therapeutic Methods in Neurosyphilis. C. L. Carlisle and U. S. Bowen.—p. 125.

*Sobisminol Mass in Treatment of Syphilis. E. A. McClintock.—p. 129.

*Optic Nerve Damage in Luetic Patients. C. E. Johnson.—p. 133.

Study of Peptic Ulcer in Chronic Psychosis. S. Rosenblyett and L. Manley.—p. 136.

Effect of Abuse of Alcohol on Electrical Activity of Heart. O. K. Timm.—p. 142.

Treatment of Pneumonia. J. R. Boswell and T. E. Dredge.—p. 145.

Typing, Prophylaxis and Treatment of Pneumonia. J. E. Faingold.—p. 150.

The Veterans' Administration Facility for Negro Beneficiaries, Tuskegee, Ala. E. H. Dibble Jr.—p. 158.

Library Activities at Tuskegee. Sadie P. Delaney.—p. 163.

Treatment of Neurosyphilis.—The efficacy of chemotherapy, particularly sobisminol mass developed by Hanzlik, following hyperpyrexia for the treatment of neurosyphilis is discussed by Carlisle and Bowen, by McClintock and by Johnson. Carlisle and Bowen point out that hyperpyrexia induced by malaria or short wave diathermy should be complemented by chemotherapy, as it is unlikely that pyrexial therapy ranging from 104 to 107.6 F. will uniformly and for long enough heat all the tissues of the body to this spirocheticidal point. Therefore they believe that chemotherapy should take care of any spirochetes which escaped the spirocheticidal effects of the heat. For this McClintock believes that sobisminol mass orally is indicated, as the daily urinary bismuth excretion level at from 3 to 5 mg. necessary for effective spirochetal destruction is easily maintained by its continued administration. This has been shown by various investigators. This level of excretion was easily maintained for the four patients treated at the Veterans' Administration Facility* at Palo Alto, Calif., by the daily oral administration of 900 mg. of sobisminol mass for as long as eight weeks. Mild toxic symptoms, nausea, vomiting, grip, stomatitis, anorexia and a bismuth line do occur but did not in their patients. However, the toxicity is immediately relieved when the drug is discontinued. Because of toxic symptoms treatment with sobisminol mass had to be discontinued permanently with four and temporarily with seven of ninety patients treated by Scholtz, McEachern and Wood. Johnson discusses the incidence of optic nerve damage, and toxic amblyopia as by-effects of trypanamide treatment of neurosyphilitic patients. He recommends routine ophthalmologic examination of the neurosyphilitic patient on admission to the hospital, as these will make subsequent comparisons possible. It has been stated by Moore that if any visual impairment is to occur it will appear by or before the fifth weekly injection of trypanamide. If no impairment is apparent by the twelfth injection the drug may thereafter be administered with impunity. All patients should be cautioned to report any visual disturbance following trypanamide therapy. Regardless of how psychotic the patient may be, any report of a visual change should be heeded and acted on immediately. At this time probably no changes will be apparent in the disk head provided treatment (hyperpyrexia and chemotherapy) for the neurosyphilis was instituted fairly early. Field changes must now be relied on and if present and trypanamide is discontinued it is usually possible to arrest the optic process.

Michigan State Medical Society Journal, Lansing

39:613-728 (Sept.) 1940

- Common Lesions of Vulva. F. J. Taussig, St. Louis.—p. 637.
Fungi: Relation to Respiratory Allergy: Air Survey in Southern Michigan. G. L. Waldbott, M. S. Ascher and A. B. Ackley, Detroit.—p. 645.
Addison's Disease: Recent Contributions to Treatment. W. O. Thompson, Chicago.—p. 648.
Brill's Disease: Report of Case. D. M. Gordon, Detroit.—p. 653.
Ophthalmology: Recent Advances. S. R. Gifford, Chicago.—p. 655.
Pregnant Diabetic Women: Prenatal and Postnatal Care. A. Sindoni Jr., Philadelphia.—p. 660.
Undulant Fever: Outbreak at Michigan State College. C. F. Holland, East Lansing.—p. 666.
Electrosthethophone and Recording Apparatus for Fetal and Adult Heart. H. Kirschbaum, Detroit.—p. 671.

New Jersey Medical Society Journal, Trenton

37:437-486 (Sept.) 1940

- Surgical Problems in Hereditary Polydactylism and Syndactylism. S. T. Snedecor and W. K. Harryman, Hackensack.—p. 443.
Carcinoma of Bladder. V. P. Butler, Jersey City.—p. 449.
Hospital Service Plans at the Crossroads: Review of Conditions to Be Met. P. Keller, New York.—p. 453.
Physical Therapy in General Practice. R. Kovacs, New York.—p. 458.
Public Health of Tomorrow. J. R. Morrow, Ridgewood.—p. 462.
Undulant Fever. F. W. Lathrop, Plainfield.—p. 466.

Northwest Medicine, Seattle

39:315-350 (Sept.) 1940

- Digitalis: Its Uses and Abuses. N. C. Gilbert, Chicago.—p. 317.
Intestinal Obstruction: Review of Its Principles. D. G. Willard, Tacoma, Wash.—p. 322.
Role of the General Practitioner in Antituberculosis Campaign. R. W. Hemingway, Bend, Ore.—p. 326.
*Tuberculin Test, Changing Concepts and Uses. K. M. Soderstrom, Seattle.—p. 329.
Treatment with Vitamins. D. L. Wilbur, San Francisco.—p. 332.
Reconstruction of Lower Lip. A. F. Cunningham, Spokane, Wash.—p. 336.
Meckel's Diverticulum with Ectopic Gastric Tissue, Perforation and Hemorrhage. S. F. Herrmann, C. P. Larson and B. A. Brown, Tacoma, Wash.—p. 337.
Obstetric Analgesia and Anesthesia. J. C. Brougher, Vancouver, Wash.—p. 339.

Tuberculin Test.—Soderstrom points out that the belief that allergy and immunity to tuberculosis are one and the same thing is refuted by the analysis of the statistically significant studies on the tuberculin test made during the last few years in Tennessee. Too many indisputable x-ray evidences of healed tuberculosis were found in negative reactors to allow the standard teachings to go unchallenged. The Tennessee studies revealed that a person giving a negative tuberculin reaction is not necessarily one who has never been infected by the tubercle bacillus. The phenomenon of "allergy reversion" has been shown experimentally and can be deduced from available figures based on clinical observations. If, as is acknowledged, a relatively few years ago human beings were approximately 100 per cent positive reactors from the teen age to senility, what is there to explain the fact that those young adults, who were all positive a couple of decades ago, are approximately 50 per cent negative reactors today? It seems to the author that they have lost their allergy to tuberculin or that it has become diminished to the point that it is not detected by the cutaneous test. They have reverted from positive to negative states and there is no evidence that they have lost their expected resistance as acquired from a primary infection. Long explains this as a reversion due to lack of repeated allergy-producing doses of tubercle bacilli, which seem to be necessary for the maintenance of allergy. To argue that the rapid decline in positive reactors is making for a race of increased susceptibility is not considering inherited racial immunity, which, having been created during the centuries past, is hardly dependent on created allergy in the individual. At present it seems that the value of the tuberculin test, though changing, has led into newer and probably more fruitful fields of application. The clinical case of tuberculosis, the sick patient, will almost invariably react to a properly applied tuberculin test. A true tuberculin negative reactor rarely could have tuberculosis. This statement is of increasing importance when one considers that the day of almost universal positive reactors among adult population groups is passing into one in which the positive adult reactor is in the minority. The meaning of a positive adult reactor with or without pulmonary symptoms is becoming more and more indicative of pathologic changes. There may be

the day when this is just as true as the relation that a positive Wassermann reaction bears to the person with clinical syphilis. In the light of the changing values of the tuberculin test its use in mass surveys and case finding attempts must be reappraised. The author does not believe that the justification for mass group testing exists today that existed several years ago. He does not question the merits of testing the school child, with the aim of using this to impress him with tuberculosis education. However, he points out that its most fruitful application as a case finding procedure is in the physician's office in his routine practice. If the clinician will remember that tuberculin should be used on the individual patient in question, not on the patient's relatives, and that all negative reactors should be rechecked with a stronger solution of potent tuberculin, using the proper intradermal technic, he will find an inexpensive procedure offering a substantial reward for the effort expended. Soderstrom believes that official health agencies can best give their attention to proper follow-up of known cases and of tuberculosis contacts through the practicing physicians' cooperation who use tuberculin in their practice. This cooperation will speed the day when eradication of tuberculosis may be a reality rather than a mere probability.

South Carolina Medical Assn. Journal, Greenville

36:241-266 (Sept.) 1940

- Observations on Conduct of Labor. J. D. Guess, Greenville.—p. 241.
The Orthopedic Problem in the South. A. T. Moore, Columbia.—p. 244.
Regional Enteritis. A. F. Burnside, Columbia.—p. 249.

Surgery, St. Louis

8:409-574 (Sept.) 1940

- Chordoma. V. Richards and D. King, San Francisco.—p. 409.
Variations in Origin and Course of Hepatic Artery and Its Branches: Importance from Surgical Point of View. E. Z. Browne, New Orleans.—p. 424.
Subcapsular Rupture of Liver in Child. T. F. Corriden, Northampton, Mass.—p. 446.
Intraperitoneal Use of Hypertonic Glucose Solution: Experimental Study with Reference to Prevention of Adhesions. H. P. Totten, Los Angeles.—p. 456.
Simple Apparatus for Relief of Some Palsies of Upper Extremities. E. Pólya, Budapest, Hungary.—p. 464.
Ethyl Chloride Spray for Sprained Ankles. L. Cozen and B. S. Holcombe, Los Angeles.—p. 468.
Radiation Therapy for Recurrent Sacrococcygeal Cysts and Sinuses. R. Turell, New York.—p. 469.
Conservative Management of Sigmoidoscopic Perforation. M. A. Sallick, New York.—p. 473.
Reliability of Roentgenographically Determined Pineal Gland Shift in Brain Tumors: Note. R. Y. Herren, Portland, Ore.—p. 478.

Virginia Medical Monthly, Richmond

67:525-592 (Sept.) 1940

- Remarks Concerning Some of the Activities of the Medical Society of Virginia—1939-1940: Presidential Address. H. H. Trout, Roanoke.—p. 525.
Evaluation Study of Serodiagnostic Tests for Syphilis as Performed in Thirty Laboratories in Virginia. I. C. Riggan, E. M. Holmes Jr., O. L. Anderson, A. Corpening and Elsie Foxhall, Richmond.—p. 529.
Interpretation of the Drawings Made by Maladjusted Children. J. N. Williams, Richmond.—p. 533.
Stone in Urinary Tract. B. E. Harrell, Norfolk.—p. 538.
Injuries of Urinary Tract. A. A. Creecy, Newport News.—p. 542.
*Hypodermic Use of Adrenalin Chloride for Relief of Menstrual Cramps. J. T. Wolfe, Washington, D. C.—p. 548.
Discussion of Arterial Hypertensive Disease (Hypertension). W. N. Thompson, Stuart.—p. 551.
Calcium Problem in Obstetrics. J. Bear, Richmond.—p. 553.
Volatile Oil Poisoning: Case. R. von Lehn Buxton, Newport News.—p. 557.
Endocrinology Briefs: Pituitary Gland. J. P. Lynch, Richmond.—p. 558.
Acute Laryngotracheobronchitis: Report of Case. S. Newman and W. E. Dickerson, Danville.—p. 560.
Sulfanilamide Therapy Followed by Hemorrhages in Fundus of Eye. J. P. Baker Jr., Richmond.—p. 562.

Epinephrine for Relief of Menstrual Cramps.—Wolfe gave seven patients with dysmenorrhea hypodermic injections of epinephrine on the theory that contraction rings and menstrual cramps are produced by spasm of the cervical and uterine muscle fibers and that they can be relieved through the autonomic nervous system by stimulating the sympathetics. Five of the patients had a less severe type of disorder; they responded promptly and experienced relief within five minutes of the injection.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Journal of Surgery, Bristol

28:1-160 (July) 1940

- Sarcoma of Muscles and Connective Tissue Spaces of Limbs. G. Gordon-Taylor.—p. 1.
Skeletal Muscle Tissue Tumor. M. N. De and B. P. Tribedi.—p. 17.
*Treatment of Mixed Tumors of Parotid Gland. D. H. Patey.—p. 29.
Lung Injury in Intact Thorax: Report of Case. M. Fallon.—p. 39.
Carotid Ligation in Saccular Intracranial Aneurysms. J. Schorstein.—p. 50.
End Results and Treatment of Tuberculous Disease of Ankle and Tarsus. W. R. D. Mitchell.—p. 71.
Spontaneous Fracture of Apparently Normal Fibula in Its Lowest Third. H. J. Burrows.—p. 82.
Dislocations and Fracture Dislocations of Talus. J. G. Bonnin.—p. 88.
Delayed Ossification of Tibia in Apparent Congenital Absence. W. M. Dennison.—p. 101.
Fractures of Head and Neck of Radius. R. C. Murray.—p. 106.
Testicular Tumors: Nine Cases, Including Epididymoma and Chorioma. A. W. Adams.—p. 119.
Septicemia. L. E. H. Whitby.—p. 124.

Treatment of Mixed Tumors of Parotid Gland.—Patey reviews the present position on the treatment of mixed tumors of the parotid gland. He bases his conclusions on the experience of others as revealed in recent literature and on the surgical and x-ray records of cases seen at the Middlesex Hospital, some of which were under his care and some under the care of his colleagues. He concludes that the natural course of mixed parotid tumors is to increase in size at varying rates, leading to a corresponding degree of deformity but otherwise causing little disability. Spontaneous malignant change in a mixed tumor is so rare that it may be ignored. Surgical enucleation alone may be satisfactory, but recurrence is seen in too many cases, and in some of these the recurrence is directly responsible for the death of the patient. There should be no hurry to treat these tumors. A period of observation to determine the rate of growth may be advantageous. In mixed parotid tumors appearing late in life, and in slowly growing tumors appearing earlier, the correct treatment may be to do nothing. Radical excision of the parotid is too deforming to be a routine treatment. However, in exceptional cases this may be the correct procedure in which complete facial palsy is justifiable. Irradiation alone is not a satisfactory form of treatment. It may be a useful diagnostic measure, indicating whether the tumor is or is not radiosensitive. Preoperative irradiation is valuable, since it renders the capsule of the tumor tougher and less liable to rupture during operation. Enucleation followed by irradiation appears to be the best active treatment for mixed parotid tumors.

British Medical Journal, London

2:275-306 (Aug. 31) 1940

- Effects of Precipitated Silica and of Iron Oxide on Incidence of Primary Lung Tumors in Mice. J. A. Campbell.—p. 275.
Rapid Death in Bile Peritonitis. D. M. Douglas and G. G. Turner.—p. 280.
Lipoid Pneumonia. S. A. Probert.—p. 282.
*Comparison of Toxicity of Tryparsamide and Neocryl in Treatment of Neurosyphilis. A. O. F. Ross.—p. 283.
Reception of Air Raid Casualties. H. A. Brittain and K. A. Latter.—p. 284.

Toxicity of Certain Arsenicals Used for Neurosyphilis.—From 1936 to July 1939 Ross treated 256 cases of neurosyphilis with tryparsamide and 314 with sodium succinylmethylamide-*p*-arsonate (neocryl). The standard dose of each drug was 3 Gm. intravenously once a week until 30 Gm. had been administered. A survey of the records of the cases at least twelve months after the end of treatment has confirmed the early impression that the results obtained with neocryl are in no way inferior to those of tryparsamide. As the work progressed and it became evident that neocryl was relatively harmless, it was chosen for all cases exhibiting visual disturbance, optic atrophy, in which tryparsamide is contraindicated. The usual toxic reactions were considerably more frequent in the tryparsamide series than in the neocryl group. Neocryl did not cause any functional visual disturbance, but in one patient with tabes dorsalis after nine doses sudden and complete blindness occurred. The blindness which followed in three cases treated by tryparsamide was gradual in its development. In three cases optic atrophy present

before the administration of neocryl became worse but in nine other known cases no ill effect was produced. Of 256 cases treated with tryparsamide seventy-eight exhibited toxic manifestations, whereas of 314 cases treated with neocryl only twenty-seven had toxic reactions. Both compounds may cause jaundice, dermatitis and other undesirable reactions seen after the administration of trivalent arsenicals; but it is chiefly in its relative innocuity to the optic nerve that the advantages of neocryl become apparent. Visual disturbance occurred in forty-seven of the seventy-eight cases which reacted unfavorably to tryparsamide: in thirty-six the signs were subjective but in eleven they were objective; in three total blindness developed. Neocryl was accountable for only one case of visual damage. The author believes that neocryl is to be preferred in all cases of neurosyphilis in which the administration of pentavalent arsenicals is necessary.

Lancet, London

2:253-286 (Aug. 31) 1940

- Late Complications of Abdominal War Wounds. W. H. Ogilvie.—p. 253.
A Week-End with War Neuroses. M. Culpin.—p. 257.
Assessment of Level of Nutrition: Tests for Vitamin C on Groups of Poorly Fed and Well Fed School Children. L. J. Harris.—p. 259.
*Treatment of Tetanus with Evipal Soluble and Sulfapyridine. J. Bryant and H. D. Fairman.—p. 263.

Evipal Soluble and Sulfapyridine for Tetanus.—In the course of an outbreak of cerebrospinal meningitis in the Dinka districts in Equatoria province of the Anglo-Egyptian Sudan, Bryant and Fairman observed that patients with tetanus were occasionally brought to Sudan Medical Service dressers in treatment centers established in the infected districts. Some dressers had seen tetanus before and recognized it; others had not. Relations of the sick, if told that the patient had not cerebrospinal meningitis but tetanus, as a rule demanded treatment and lumbar puncture. The treatment was always given by the dresser as for cerebrospinal meningitis by lumbar puncture and injections of sulfapyridine. During the constant patrolling of the epidemic areas the authors saw these cases in treatment centers and administered evipal soluble (evipal sodium), leaving enough of the drug with the dresser to keep the patient quiet or, if necessary, anesthetized for three or four days. All of the twenty-two cases of tetanus recorded here were typical and severe and without treatment most would probably have had a fatal outcome in a day or two. However, under treatment with sulfapyridine and continued or intermittent narcosis with evipal soluble all but five recovered. The authors also state that during the last few years cases of tetanus were occasionally treated with evipal soluble alone. Results have been fair and unexpected recoveries made. Numbers are too small for analysis, but if the patient could be kept alive for five or six days he seemed to have a good chance of recovery. Lumbar puncture was always performed. Recovery in these cases was always extremely slow and wasting was pronounced. In the light of this experience with evipal soluble alone, the authors think that in the cases treated with sulfapyridine and evipal soluble, recovery has been too rapid and mortality too low to be explained away entirely by the muscular rest produced by prolonged narcosis. They suggest that it is possible to save many patients with tetanus in remote places where high temperatures and inaccessibility preclude the use of serum.

Chinese Medical Journal, Peiping

57:501-622 (June) 1940

- Relationship Between Canine and Human Kala-Azar in Peiping and Identity of Leishmania Canis and Leishmania Donovanii. H.-L. Chung.—p. 501.
Effect of Cooking on Vitamin C Content of Vegetables. T. F. Yü.—p. 523.
Thiersch Skin Grafting: Use of Collodion Gauze Technic. C. Szutu and C. Y. Chen.—p. 535.
Clinical Application of Plasma Viscosity Determination: Description of Pipet Viscosimeter and Report on Findings in Tuberculosis. B. H. Y. Tang and S. H. Wang.—p. 546.
Homogeneity of Bacteriophage Types of Bacillus Typhosus Isolated from Patients and Carriers. C. H. Yen.—p. 556.
Studies on Food and Digestive System of Certain Parasites: VI. Food of Certain Helminths Living in Digestive Tract of Vertebrates. H. F. Hsü and S. Y. Li.—p. 559.
Deformities in Refugees Owing to Intramuscular Hemorrhages in Scurvy. S. Hoyte.—p. 568.
Osteomyelitis Variolosa: Report of Case. P. L. Fan.—p. 571.
Rupture of Stomach in Opium Poisoning: Case Report. W. N. Bien and S. D. Wu.—p. 574.

Annali di Ottal. e Clin. Ocul., Genoa

68:161-240 (March) 1940

Modifications of Adnexa Oculi Due to Acanthosis Nigricans. M. Corrado.—p. 161.

*Parinaud's Conjunctivitis. A. Castelli and L. Molina.—p. 179.

Parinaud's Conjunctivitis.—Castelli and Molina were able to isolate from an exogenously infected human subject an acid-fast organism which they regard as the true infective agent in Parinaud's conjunctivitis and as a new species of mycobacterium. This organism is intensely pathogenic for certain laboratory animals but induces a mild infection in man. The authors were able to observe its morphologic, biologic and staining characteristics under aerobic and anaerobic conditions during the course of three years and conducted extensive experiments on more than 200 animals. The bacillus, in their opinion, is definitely differentiable from *Mycobacterium tuberculosis*, human and bovine, by significant biologic and cultural traits. Anatomopathologic and microscopic examinations of the lesions produced in the lungs, liver, lymph nodes, iris and conjunctiva and tuberculin assays for differential diagnosis confirmed their discovery. Animals immunized against tuberculosis by repeated inoculations with BCG vaccine succumbed to the infection of the new organism but successfully resisted high doses of virulent Koch bacillus. The authors believe that Parinaud's conjunctivitis is a definite disease entity and not a syndrome provokable by a variety of pathologic causes. Atypical cases of Parinaud's conjunctivitis are probably of tuberculous origin. Clinically the disease presents itself as foci of subepithelial infiltrations that rarely ulcerate and consist predominantly of mononuclear elements; plasma cells are occasionally found in considerable number, especially about the periphery of the nodules; polymorphonuclear and giant cells are rare. An extensive clinical and bibliographic material is subjoined.

Rassegna di Fisiopatologia, Pisa

12:193-240 (May) 1940

*Protein Picture of Blood and Ascitic Fluid in Atrophic Cirrhosis of Liver. D. Mircoli and M. Ferroni.—p. 193.

Studies on Permeability in Man of Kidneys by Dextrose: III. Effect of Adrenal Cortex Extract and Epinephrine. C. Bianchi.—p. 216.

Blood and Ascitic Fluid Protein in Cirrhosis.—Mircoli and Ferroni studied the relation between the protein levels of the blood and those of the ascitic fluid before and after paracentesis in cases of atrophic cirrhosis of the liver. Their observations of the modifications of protein levels included those of the albumin and globulin content and were based on more than 100 biochemical assays carried out during two to eight months on four cirrhotic patients. Total blood protein levels maintained a notable constancy throughout the course of the disease; however, initial and final levels hovered near the lowest normal limits. In the final stages of the disease with marked hepatic insufficiency the protein levels did not vary from those initially observed. Only a moderate reduction in the protein content of the blood was caused by the withdrawal of ascitic fluid in the majority of cases. Restoration of previous levels usually occurred within a week. The effect of paracentesis on the albumin and globulin fractions was to reduce, at first, the albumin content and to increase the globulin content. Total protein levels of the ascitic fluid behaved differently from those of the blood, showing a decrease after paracentesis. In general, high globulin levels in the blood were associated with high globulin levels of the ascitic fluid, both before and after paracentesis. In the great majority of tests of the protein quotients of the ascitic fluid, a clear tendency was exhibited by the globulins to predominate over the albumins. The effect of paracentesis on the protein quotients of the ascitic fluid was to increase it more often than to decrease it. The authors question the significance attached to the function of the liver in the production of blood proteins in general and of albumins and globulins in particular. They base their doubts on the observations that, even in late stages of atrophic cirrhosis of the liver in which decided hepatic insufficiency has occurred, almost unchanged blood protein levels are encountered.

Día Médico, Buenos Aires

Spec. Ed. 91-142 (Aug.) 1940. Partial Index

Antitumoral Endocrine Factors. L. Vargas.—p. 102.

Laparoscopy as Diagnostic Aid in Intraperitoneal Tumoral Metastasis.

H. E. F. Stocker and J. V. Uriburu.—p. 108.

*Presence of Ether-Soluble Protein in Serum of Persons with Neoplasms.

C. Esculies and J. Esculies.—p. 116.

Modern Conceptions of Origin, Evolution and Treatment of Pleurisy

and the Surgeon. E. A. Martinez.—p. 117.

*Postoperative Adrenal Insufficiency. A. Lucena, A. Peregrino,

C. Ramos and N. Bethlem.—p. 123.

Ether Soluble Protein in Serum of Patients with Neoplasms.—Their previous isolation of an ether-soluble substance from the serum of cancer patients for the diagnosis of carcinoma (nineteen cases analyzed) was confirmed by Carlos and José Esculies, using a revised technic that employed T. B. Robertson's microrefractometric method for serum analysis of minute globulin and albumin percentages in the blood serum. Observations of carcinomatous and other patients after total extirpation of the tumor growth had shown that reactions, previously positive, had become negative. This was not true for partial extirpation. The ether-soluble substance isolated is regarded by the authors as of protein nature and is susceptible of precipitation by sodium sulfosalicylate. Further observations directed to the albumin and globulin fractions of the protein disclosed that the reactive property resided in the globulins but only as vectors of the ether-soluble protein, not as substances independently capable of eliciting positive response, though hyperglobulinemia was regularly found in all serums. This ether-soluble protein in cancer patients may either be the product of an abnormal metabolism of the cancer cells vitiating normal protein metabolism or a protective ferment called into being against the invasion of abnormally metabolized protein derivatives. Both interpretations are correlated with the observations of previous investigators. The problem of establishing whether the protein isolated by the authors possesses fermenting activity in the presence of the same serum from which it is extracted as well as that of determining the precise polarimetric deviation requires further investigation.

Postoperative Adrenal Insufficiency.—Lucena and his associates investigated the effect of surgical intervention on the activity of the adrenal glands in twenty-three cases, five of which presented a grave clinical picture, from the point of view of the modifications of sodium and potassium levels of the blood. Basing their biochemical calculations on a normal standard of from 18 to 20 mg. per hundred cubic centimeters for potassium and from 320 to 340 mg. for sodium in the blood, they found clear evidence of postoperative upset of balances equivalent to adrenal insufficiency, entailing clinical manifestations of varying intensity, in every case. An abnormal ratio of both chemicals was ascertained in 85.7 per cent of the cases. In 10.7 per cent the potassium content was normal but the sodium levels had fallen below normal; on the other hand, in 3.6 per cent of the cases normal sodium levels were associated with an increased potassium count. Sixteen of eighteen cases examined (88.88 per cent) showed hypotension. The authors believe that every surgical intervention constitutes an invasion of the adrenal glands, capable of inducing a grave and even fatal insufficiency in serious and atypical cases.

Nordisk Medicin, Gothenburg

6:1083-1118 (June 22) 1940. Partial Index

New Operation Knife. E. Perman.—p. 1083.

*Tuberculous Bone Foci. G. Odelberg-Johnson.—p. 1084.

Tuberculous Bone Foci.—Odelberg-Johnson states that the tuberculous bone focus is a part symptom of tuberculous infection and that treatment must be directed against the general tuberculous disease. By local treatment in the form of operative and orthopedic intervention and long-continued fixation and elimination of weight bearing, local healing and maintenance of function can be attained in the best cases, especially when removal of the bone focus is possible. As a rule there is healing with limited function. Sometimes the process continues in spite of general and local treatment. The author emphasizes the importance of carrying out major operative or orthopedic measures when the general condition is optimal and the activity of the tuberculous infection is minimal, while on the other hand treatment must not be so conservative that the indicated intervention is delayed too long.

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PSYCHOTIC AND SOMATIC INTERRELATIONS

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It is curious that the appreciation of the interrelation of mental and biochemical rhythm has been so long delayed. Now it would seem that almost overnight "psychobiology" has been achieved although actually Adolf Meyer has been devoted for years "to the reactions of the unitary organism and the study of man as a person."

There have been at least two impediments: First, the biochemist has shunned long time observations on the human subject, although Otto Folin some thirty-five years ago¹ pointed out the absolute necessity of such an approach.

The biochemist, usually studying single samples of blood from presumably "normal" persons, has set up a series of so-called normal standards, quite overlooking the fact that even normal persons, when studied over long periods, may reveal deviations of considerable magnitude—not only in such basic values as the p_H , the carbon dioxide content and the chloride concentration of the blood but in the values for calcium, potassium, sugar or cholesterol.

The biochemical study of the psychotic patient is essentially a dynamic, not a static, problem—it involves evaluation of levels that may be critical for the individual under observation, even though they lie within the statistically "normal" range.

Second, the psychiatrist is preoccupied with the intangibles of psychopathology, of psychosomatics and of psychoanalysis and with the relative details of miscellaneous social and domestic environmental factors that presumably might shed light on psychic reaction.

We will begin by stressing the fact that the psychotic person lives in an atmosphere and that atmospheric environment in this region of the world varies tremendously from day to day. Most psychiatrists are in agreement that the psychic " . . . the psychotic patient are very . . . the scene" environmental alterations of all kinds, that they are unusually unstable and readily fatigued organisms.

We will agree that the tissues of the central nervous system are most susceptible to change in oxygen ten-

sion. Combining these several lines of agreement, we might inquire whether the patient with a psychotic predisposition may not be unusually susceptible to changes in weather, because weather is concerned with oxygen supply. Weather provides the kind of air that one breathes.

It is impossible to enter into the detailed analysis of metabolic phase fluctuations in the space here available. Suffice it to say that every organism is constantly pendulating between poles of normality: (a) from increase in blood pressure, on the one hand, to decrease, on the other, (b) from a period of high metabolic rate to one of low, (c) from depressed oxidation or preponderant reduction to one of adequate oxidation and lessened reduction, (d) from dehydration to hydration and (e) from increased cellular permeability to decreased cellular permeability.²

MOODS IN THE NORMAL LEPTOSOMATIC AND PYKNIC

Practically every normal person is aware of occasional change in mood, the intangible and possibly subconscious perception or awareness either of somatic equilibrium or of departure from normal equilibrium in the direction of greater exhilaration and buoyancy or of depression (thymergasia), the feeling of inadequacy and futility (parergasia).

While the perfectly normal and well equilibrated person will reveal fewer swings in moods, the somatic variants in either direction (the pyknic and the leptosomatic type) are less stable, and in these groups one finds a distinct increase in the number of persons who reveal more marked shifts in mood. During youth the pyknic individual is usually very stable but occasionally has periods of behavioristic disorders;² in the leptosome periods of elation or depression, particularly depression, are more common.

The moods can be identified with a shift in blood chemistry. In general the pyknic individual does not experience change in mood with periods of greater acidity, i. e. lower p_H . However, with periods of increased alkalinity there frequently is associated the feeling of greater energy, restlessness and exuberance. Then may follow irritation, explosive anger, temper tantrums, and the like.

The leptosome reveals less reaction to a swing in the alkaline direction. An increase in the p_H of the blood does not bring about much of a shift toward a feeling of buoyancy. Periods of decrease in the p_H are definitely associated with "blueness," depression and finally irritability in many persons of this type.³

Read before the Section on Nervous and Mental Diseases at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

From the Department of Pathology, Bacteriology and Public Health of the University of Illinois College of Medicine and the Department of Psychiatry, University of Wisconsin Medical School.

1. Folin, Otto: Some Metabolism Studies with Special Reference to Mental Disorders, *Am. J. Insan.* 60: 699, 1903-1904; 61: 299, 1904-1905.

2. Petersen, William F., and Milliken, Margaret E.: The Patient and the Weather: (a) Autonomic Integration, Ann Arbor, Mich., Edwards Brothers, Inc., 1936, vol. 1, pt. 2; (b) Mental and Nervous Disease, *ibid.* 1934, vol. 3.

3. Similar pendulations of rhythm in many of the other blood constituents and physiologic mechanisms have been determined (Petersen and Milliken²).

If change in weather can affect the blood chemistry so profoundly, may it not be expected that the abnormal psychobiologic status may at times shift to normal or a phase of quiescence and relative adjustment or that disturbance and a psychopathologic state may be precipitated by meteorologic disturbances?

WEATHER CONDITIONING OF THE PSYCHOTIC STATE

In order that our study may be wholly free from personal selection or bias, we turn to the first American day by day study of changes in the psychotic patient, with coincidental clinical vascular and blood cytologic studies, published by Dr. Francis M. Barnes Jr. in 1909.⁴

As the observations are dated and graphed, they afford an opportunity of immediately associating the clinical and laboratory studies with the meteorologic conditions of the time.

In chart 1, Dr. Barnes's graph is subtended below a meteorogram of Baltimore for the period concerned. Characteristic psychic alterations, with periods from the beginning of the disturbance to recovery, are indicated on the Barnes graph by black bars, which are numbered from 1 to 7. While Barnes observed the rather characteristic psychotic change and associated mental alterations and cited some laboratory observations, we are here interested only in the dated mental changes associated with the precipitation of the acute attack.

An excerpt from Barnes's case record follows:

"CASE 1.—No. 541, male, aged 46.

"*Anamnesis.*—One brother and one sister are characterized as 'neurotic,' and one sister developed a psychosis from which she did not recover; otherwise, the history is unimportant. No alcoholic or drug addictions. . . . As a child he had some mild convulsive attacks, and in boyhood there was a trifling head trauma.

"The first mental attack occurred about 1890, when he was twenty-eight or nine years old.

"1900.—Since his last admission, the attacks have become more frequent and of shorter duration. At the onset, there is

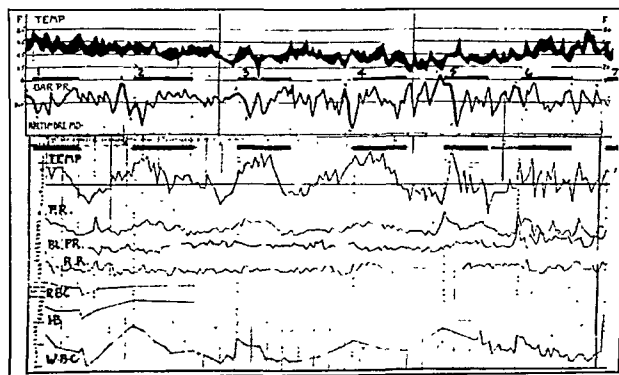


Chart 1.—Barnes's curve of observations in case 1. The heavy black lines represent periods when the patient was passing through an attack—"abnormal" days. These are numbered from 1 to 7. The curves for temperature, pulse rate, blood pressure, respiratory rate, red blood cell count, hemoglobin and white blood cell count follow, in the order given. After Feb. 21, 1908, the observations are dated. The meteorogram for Baltimore has been superimposed. It indicates daily maximum and minimum temperatures, as well as barometric pressures. Note that periods of increase in barometric pressure precede the onset of attacks.

noted motor-restlessness, insomnia, irritability, inaccessibility and irrelevance. The excitement rapidly reaches its height, and auditory and visual hallucinations are present. During this time he is careless in person and habits. The attacks

average now, from five to six weeks in duration. The only change is the appearance recently, of short periods of mutism, posing, etc., in an otherwise excited day.

"*Present Condition.*—On reviewing the condition for the past year, one finds that the changes which have taken place have been those of detail only. As a general rule, the patient exhibits no prodromal signs by which the beginning of an 'abnormal' period can be detected. Occasionally for a period of from twenty-four to forty-eight hours he may appear drowsy and disinterested in his usual pastimes. The onset may occur in either one of two ways: after a night's

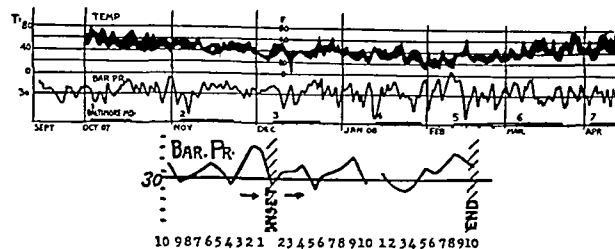


Chart 2.—Baltimore meteorogram with periods of attacks in Barnes's case 1, indicated by black bars. The mean barometric pressure for the seven episodes is indicated in the graph below the meteorogram for the ten days preceding the attack, the day of the onset and the following nine days, and the ten days following the attack.

undisturbed sleep, he may awake mute and resistive; later in the day this mutism may be interrupted by a psychic elevation with marked logorrhea, irrelevancy in answers and inaccessibility, with slight distractibility, which condition, however, is soon replaced by the former one of mutism and resistiveness. The most common onset is that with mild excitement which persists for several hours and is replaced by a mute, resistive phase. During the excited phase he is quite inaccessible; attention is poor or wanting and there is but little distractibility or divertibility; association is rapid but imperfect. Occasionally one may get a reply to questions, but the replies are irrelevant in the extreme. Irritability is often marked; logorrhea is continuous, the stimulus apparently is mostly internal, but at times the trend of thought is obviously influenced by outside events.

"The average course of an attack varies somewhat. As a general rule, after a few hours of mild excitement there follows a period of from five to ten days' duration during which he will remain in bed, mute and resistive. Occasionally during this period a condition of mild excitement will return for transient intervals. During the first few days he is untidy in person."

The seven abrupt psychic changes illustrated in the graph began on Oct. 3, Nov. 4 and Dec. 7, 1907, and on Jan. 13, Feb. 11, March 5 and April 3, 1908.

When studies were made with sufficient frequency, as toward the end of the period, it is noted from Barnes's graph that each episode was associated with an increase in leukocytes and in temperature, pulse rate and respiratory rate, as well as in blood pressure (the last change is observed in characteristic fashion in the fifth and sixth episodes).

A careful examination of the meteorologic temperatures and barometric pressures which have been superimposed above the Barnes graph reveals a rather characteristic meteorologic situation, namely a period of cold and high barometric pressure that existed before the change in the clinical status. The mean barometric pressure for the ten days preceding the attack, for the day of the attack and the following nine days and for the following ten days is shown in chart 2. Here the seven attacks are indicated by black bars below the meteorogram, and the mean barometric pressure is indicated on the graph below.⁵

4. Barnes, F. M., Jr.: A Clinical Study with Blood Examination of Two Atypical Cases Related to the Dementia Praecox Group, *Am. J. Insan.* 65: 559, 1909. The cases studied by Barnes are similar to those studied by Gjessing (*Beiträge zur Kenntnis der Pathophysiologie des katatonen Stupors*, *Arch. f. Psychiat.* 96: 319, 1932).

5. Because of the small number of dated attacks here available a statistical analysis is of little value; nevertheless, the probability of such a situation occurring by chance is but 1:10. The usual level of significance taken for discarding a negative hypothesis is 1:20; however, when one considers the nature of the problem, the probability of 1:10 may be sufficiently small to conclude that the movement of the barometer is an important contributing factor in the dating of the attacks.

An increase in barometric pressure of the magnitude here involved indicates that a cold air mass passed over the region and this was in turn followed by the passage of a cyclonic (warm) air mass of more than usual severity. An unusual environmental situation is effective in producing an unusual biologic (and psychic) reaction.

It is this shift that results in the characteristic behavior of the patient—first a period of stimulation and restlessness, followed by stupor. The diversion of biologic phase pendulation we have described as the ARS phase and the COD phase to indicate (1) a period of relative anoxia in the peripheral tissues of the central nervous system and (2) a period of compensation.

After this unusual phase of stimulation and fatigue, a certain amount of time is required for the psychic state to become relatively stable and normal. After this state has been reached the recovery period lasts for a variable time, during which the patient is relatively resistant to environmental swings.

When one compares the shifting moods of the normal young pyknic with those of the leptosome and relates them to the biochemical status of the time and to the weather, it is noted that the leptosome is more apt to become "blue," moody and finally irritable after periods of cold (actual or relative), i. e., the metabolic status is one of lowered p_{H_2} , low blood pressure and low blood sugar (COD phase). It corresponds to biologic overstimulation or fatigue.

The pyknic individual is relatively indifferent to this status but becomes buoyant, energetic, restless and ultimately irritable, with periods of increase in p_{H_2} , most often associated with the passage of a polar front. At that time an increase in blood pressure and blood sugar and a relatively high potassium calcium ratio exist. The cerebral tissues are functioning under conditions of relative anoxia, demonstrable in the peripheral and pelvic vascular beds.

These associations in the normal person are related to the characteristic psychic manifestations in the schizophrenic and the manic-depressive patient and account for the fact that the schizophrenic (slender!) type is often more activated in the spring (relative spring acidity!) and the manic-depressive (broad!) in the summer and autumn (period of relative alkalinity), as demonstrated in admission records in all state hospitals.

ACUTE EPISODES: WEATHER AND THE MENSTRUAL CYCLE

Barnes's second patient was a woman. In this case one is immediately faced with the biologic phase interference caused by the menstrual cycle,^{2a} which, in its various components, may amplify or negate the biochemical swings and incidental reactions induced by the meteorologic situation. As a result, the ultimate biologic and psychic reactions become much more complicated.

A part of Barnes's description of the case follows:

"CASE 2.—No. 547, female, aged 43.

"*Anamnesis*.—One sister died of tubercular meningitis; a paternal uncle was insane, and a maternal aunt has for a number of years been invalided with hysterical paralysis. There was no consanguinity, no history of alcoholic or drug addictions. History of the patient's early life is unimportant; there were no convulsions during childhood or later. She obtained a college education and was a good student. Since about sixteen years of age, at which time her mother died, she has been rather melancholic and of a depressed disposition, more reserved and quiet than formerly. Menstrual function was normal in

all respects until 1890, at the age of twenty-five, when she received a severe fall from a horse; since then there has been considerable irregularity in time, associated with pains, headache, etc.

"The first evidence of the present psychosis appeared in 1892, following the prolonged nursing of her sister. She became restless and irritable; at first would take no rest and then became insomnolent; was auto-accusatory (had neglected her sister) and attempted suicide. There were delusions of persecution, and both auditory and visual hallucinations. When she was admitted to this hospital in 1898 it was learned that since 1892 she had repeated attacks at intervals of from two to three weeks and of from two to three weeks' duration. These have all been of a similar nature. More recently they have become more intense and violent, occurring at still more frequent intervals and lasting for shorter periods. Excitement is the most prominent feature during the attacks, when, at its height, she is violent and homicidal. A brief period of depression (apathy and inertia) may either precede or follow the excited phase; in the intervals she seems quite well.

"*Present Condition*.—There has been some change in the course of the attacks, as will be seen from a comparison of her condition in 1902 with that of 1908. Formerly, there was little evidence of the stupor which is now so marked. At the onset, which is sudden, abrupt and unheralded, occurring in the early

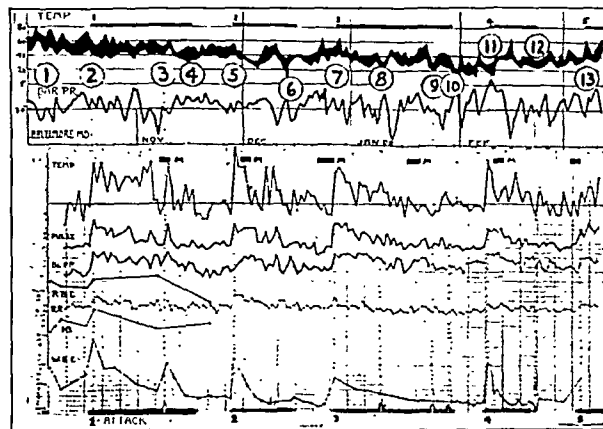


Chart 3.—Barnes's curve for patient 2, studied from Oct. 7, 1907, to March 10, 1908. A meteorogram for Baltimore, showing the daily maximum and minimum temperatures as well as the barometric pressures for this period, is superimposed above the clinical observations. The clinical curves indicate temperature, pulse rate, blood pressure, red cell count, respiratory rate, hemoglobin and white cell count. Periods of attack are indicated by black bars at the bottom and are numbered from 1 to 5. Menstrual periods are represented by the black bars over the patient's temperature curve. Circled numbers indicate the following: (1) end of a period of disturbance; (2) beginning of attack 1; (3) transient quiescence; (4) end of attack; (5) beginning of attack 2; (6) end of attack; (7) beginning of attack 3; (8) (9) and (10) days of quiescence; (11) beginning of attack 4; (12) end of attack, and (13) beginning of attack 5.

morning usually, there is wild psychomotor excitement; this after a few days gives way to a mixed state of alternating excitement and stupor, which is, in turn, replaced by a condition of stupor of varying intensity, from which she emerges to her 'normal' state."

It has been seen that the same meteorologic event initiated the onset of the second attack in case 1.

In Barnes's larger graph (chart 3), covering the observation of this patient from October 1907 to March 1908, five distinct periods are represented. An analysis of the blood pressure levels before the attack revealed a situation similar to that in case 1. During period 3 it will be noted that on three days, indicated by 8, 9 and 10, transient remissions occurred; each was distinctly associated with the passing of polar air masses.

When, as in the previous case, one examines the meteorologic association of the onsets of the attacks, one notes that attack 1 began after a period of increased

barometric pressure and falling temperature. Attack 2 occurred with decreasing temperature and rising barometric pressure; attack 3 after a period of increased barometric pressure; attack 4 in association with a barometric crest and falling temperature, and attack 5 with a characteristic polar front of considerable magnitude.

The average barometric pressure for the ten days before the attack, the first ten days after the beginning of the attack and the ten days following the attack again makes evident the fact that a period of cold (increased barometric pressure) was associated with the onset of the episode (chart 4).

When transient interruption of the stupor phase occurs, as at 3 and 8, 9 and 10 in chart 3, one finds either a menstrual period or a period of unusual meteorologic activity, i. e., a sharp polar episode, in temporal relation to the change in psychic status.

No forces in the environment are of greater significance in conditioning the swing in the moods of the normal person and the change in the psychic status of the psychotic patient than those that are grouped under the term "weather."

The air mass in which the individual exists fluctuates from the extremes of the dry, cold, clear polar front to the moist, turbid, warm and relatively light tropical mass. Life in this region of the world requires constant physical adjustment to a continually changing situation presented by the turbulence of circulation of the air masses.

The passage of a polar front initiates a series of physiologic alterations designed to insulate the organism. Incidental thereto is transient blood alkalosis,

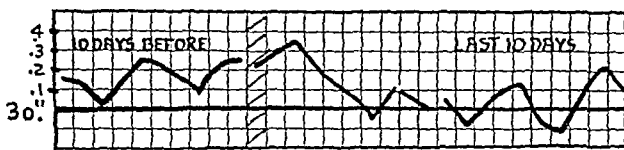


Chart 4.—Mean barometric pressure for the ten days before the onset, the first ten days of the attack and the last ten days of the five episodes recorded in Barnes's case 2. Note the increased barometric pressure associated with the onset of disturbance.

increase in blood pressure and relative tissue anoxia in the peripheral tissues, the cortex of the brain, the pelvic region and, under some circumstances, the myocardium. In the person with a manic-depressive psychosis this biochemical and endocrine reorientation frequently initiates a hypomanic attack.

This reaction is followed by a compensatory period, with relative acidity, a fall in the blood pressure level and low blood sugar and potassium calcium ratio, and generally with an increase in the basal metabolic rate and capillary permeability. In the normal person this period of stimulation may lead to actual biologic fatigue. In the schizophrenic person it is this phase that is most often associated with evidence of restlessness, excitement and abrupt changes in behavior, which are expressed in various ways.

As repeated weather episodes make up the total picture that is termed season, it becomes evident that the schizophrenic patient is more often disturbed during a period in which the general p_H levels are low—a situation occurring most often in the late winter and spring. By contrast, the manic-depressive person finds it more difficult to adjust in periods of relatively high p_H levels, and these are more apt to occur in the summer and autumn.

CONCLUSION

As far as the biochemical rhythm of any individual is conditioned by the environmental situation, both the moods of the normal person and the shifting psychic picture of the psychotic patient reflect, in varying degree, the change in weather, modified, of course, by many other forces, such as the sexual cycle, physical and mental activity, diet, infection, trauma and emotional situation. The effects of weather are most significant because they are relatively prolonged and inescapable, even when the patient is quiet and in bed (though naturally they are then modified), and reveal summation phenomena that are particularly significant in this geographic region, where frequency of change is characteristic and outstanding.

Weather will bring into relief latent hereditary dispositional and constitutional tendencies in the general psychopathic population. Loosely constructed paranoid, delusional effects or vague hallucinatory experiences may become vivid dissociations with schizoid regressions, or emotional instability swings may be augmented into a phasic manic-depressive psychosis.

Meteorologic changes will affect the never static biochemical rhythm, leading to faulty oxidative and metabolic disturbances, which, in their sequence, are mirrored in psychopathologic phenomena.

ABSTRACT OF DISCUSSION

DR. LLOYD H. ZIEGLER, Wauwatosa, Wis.: This paper, correlating abrupt weather changes with exacerbations of psychotic behavior, is interesting. The arthritic are proverbially sensitive to weather changes. The mechanism of this has not been clear. We have all observed that heat, 90 F. and above, together with humidity near the saturation point, is a devitalizing condition inimical to activity and thought. The behavior of some aviators is affected by quick changes in barometric pressures corresponding to altitudes. Caisson disease belongs here too. Some diseases appear to have a seasonal incidence, for example poliomyelitis. Psychoses may obey this law to some extent, but about this much needs to be learned. The migration of birds and the hibernation of certain animals is closely related to changes in the weather. A superb example of the effect of climate in modifying animals is to be seen at the Grand Canyon of the Colorado River. The south rim is about 7,000 feet above sea level. The north rim is about 9,000 feet, and the river and canyon have kept animals that cannot fly apart for countless years. Except for a difference in temperature, the climate of the two rims is essentially the same, and this one difference reflects itself in the animals of the same species by a variation in color, size and other qualities. Their behavior is affected as well as their morphology. One cannot deny that sudden weather changes tend to modify behavior. However, such environmental changes in themselves are not sufficient to account for the genesis of a psychosis. There must be another factor that correlates with the development of a psychosis more than the weather; thus far it has defied research, except that components of it may be exemplified in brain injuries and anomalies of development. Dr. Petersen has made extensive investigations to ascertain the effect of weather changes on disease and biochemical states of various kinds. It is well known that some people are conditioned, in the pavlovian sense, by unpleasant experiences so that the season or the weather at the moment serves thereafter as the stimulus to bring about a recurrence of the feelings associated with the original experience. Weather is one great environmental influence that is common to large groups of people. In time such studies may enable Drs. Petersen and Reese to classify people with regard to some degrees and qualities of sensitiveness, which could well be the earliest indications of a latent psychosis.

DR. IRVING J. SANDS, Brooklyn: The authors have emphasized the influence of the weather and barometric incidences and climateric situations on behavior disorders. They have

vindicated theories which the older clinicians discussed and which led to the coining of the term lunacy—the influence of the moon on human behavior. In the pioneer days of scientific psychiatry, study was limited to observations of a few clinical or pathologic manifestations. Today the human being is regarded as a total personality, as a behavior organism in which every part of his constitution participates in his reaction to situations. All observers now realize the importance of regarding the human being as a whole. We are indebted to the authors for once again directing attention to a most important subject.

DR. HANS H. REESE, Madison, Wis.: It is not easy to correlate all the weather factors which Dr. Ziegler mentioned; they make the picture too complicated. The best way is to consider only the daily mean temperature alterations and the changes in the barometric pressure. These studies support our assumption that the human being is like a cosmic resonator to his surrounding regional meteorologic environment. We postulate that the "feeling" for the barometer is conditioned by rhythmic swings in our constantly fluctuating biochemical milieu, which in the topic under discussion mirrors itself in psychopathologic reactions and psychiatric episodes. The great variability, from simple inadequate feelings and moods to extreme clinical poles of manic-depressive, schizophrenic or paranoid reactions, is related, in our opinion, to inherent genotypic deficiencies in the psychobiology of the individual. A psychic trauma, of whatever origin it may be, upsets the biochemical requisite which is necessary for increased or lessened cellular activity and subsequent functions. The well buffered person with a wide range between the poles of adjustment and of inadequacy is harmoniously integrated, he meets wear and stress situations, psychic trauma and meteorologic bouts well, because his body functions can adjust themselves readily. However, the constitutionally inadequate person with inherent genotypic deficiency will present symptoms depending entirely on the organ selectivity, which cannot make adjustments to abruptly occurring physicochemical changes. The question of adequate and inadequate oxidation in cells and tissues is the important explanation to psychic and psychiatric disorders. This is weather linked, biochemically measurable and clinically obvious. We have analyzed the excellent dated material of R. Gjessing of the University of Oslo and of K. F. Scheid of the University of Munich. We have made graphs of the meteorology of the time for Oslo and Munich, and we could study the interrelation that may be apparent. Gjessing and Scheid's material reveals that the onset of acute episodes in their cases began with a barometric crest and with a period of lowered environmental temperatures. Therefore the weather events could clarify the otherwise obscure occurrence of excitement, stupor and febrile attacks in their cases. Dr. Petersen has pointed out that the onset of psychic or psychiatric episodes coincides with definite changes in the meteorologic environment. Febrile psychotic episodes are clearly related to weather changes. We are not assuming that meteorologic "catastrophes" are the cause of nervous and mental diseases, but we are certain that the "weather" is sufficient to tip a fluctuating unstable predisposed individual into any form of mental illness.

Insect Immigrants Banned.—There are still at large in the world some 20,000 kinds or species of insect pests which have not yet been found in the United States. Many have a great capacity for harm. The federal plant quarantines have halted at our shores thousands of these new crop threats. However harmless an insect is at home, it may be far from harmless in a new environment. For example, natural enemies—parasites and predators—keep the Japanese beetle from being economically important in the Far East. It reached the United States without these natural enemies, however, and found none here to check its multiplication. In the United States the damage by this insect now amounts to nearly if not quite a million dollars a year and it is still spreading. Plant quarantines forbid unconditionally any entry into the United States of certain fruits and vegetables, such as mangoes, yams, avocados, oranges, sweet limes and grapefruit, from certain countries, mainly those to the south.—Clip Sheet, U. S. Department of Agriculture, Oct. 20, 1940.

THE DETERMINATION OF PHYSICAL FITNESS

HENRY H. KESSLER, M.D., PH.D.

NEWARK, N. J.

Among the many problems that will be given serious consideration in the program of medical preparedness will be that of physical fitness; physical fitness of the soldier to perform military service and physical fitness of the worker to perform useful productive and continuous work. That this matter is of importance can be seen in the recent press report which expressed the concern of the Army Medical Corps about the physical condition of many applicants for army service. At least 30 per cent have been rejected in the New York area because of bad teeth, poor vision, flat feet, bad hearing and other causes.¹ Such a high percentage of rejections would seem to indicate indeed a low state of physical fitness of the general population or too rigid a set of minimum requirements for acceptance.

Physical fitness has been previously studied in respect to both military and industrial activity. However, it may be desirable to reconsider the problem in view of the present crisis and reexamine some of our past ideas concerning physical fitness because of the newer evidence which seems to dispute the validity of these ideas.

False concepts of capacity to work have had an important influence on our civil, industrial and military life. They have created vague standards of physical fitness that have condemned the physically defective, handicapped by minor disabilities but possessing great potentialities for functional performance. They have been influential in setting an arbitrary industrial age deadline of 40 for the physically useful individual. They have given excessive weight to psychologic and aptitude tests for determining physical fitness, while human energy and capacity have in general been largely underestimated.

These confused ideas play an important role in our national life, since they form the basis of much of our social and labor legislation. The restrictions of hours of work and the restrictions imposed on the labor of women and children are based on presumptions of limitations of physiologic capacity to work. These physiologic criteria are frequently cloaked with social and ethical values so as to identify the violation of or the deviation from the physiologic fact with sin. So, too, the evaluation of permanent disability in workmen's compensation has no scientific foundation but relies on actuarial and legalistic criteria for its determination, even though these methods are employed by physicians. Furthermore, the value of preemployment examinations in the selection of employees and that of the periodic physical examination in the maintenance of physical fitness in the industrial worker will be largely lost if the concept of physical fitness is not clarified in the light of newer information.

DEFINITION

Physical fitness may be defined in several ways. It may be considered subjectively as a state of being, in which case it would be described as normal, healthy, efficient, free from symptoms, free from gross physical defects, ability to withstand physical effort and strain, having the capacity to work. Again it may be defined in terms of its objectives: physically fit for what? Work, play, industry, military service? In a naval

1. Leone, G. E.: Causes for Rejection for Entrance into the Regular Army Due to Physical Defects, *J. A. M. A.* 115:1283 (Oct. 12) 1940.

military sense physical fitness may be defined as "keeping as many men at as many guns as possible." In its common usage, physical fitness is considered as a combined concept in which both subjective and objective elements play a part. In any case, it is almost automatically identified with three types of states: (1) ideal or superior, (2) normal or average, (3) substandard or inferior. For the most part the basis of this classification is a vague psychosocial concept of the normal person.

CONCEPT OF NORMAL

Physical perfection is recognized as an ideal or superior state, one which few people can achieve. The normal state is one which is free from obvious physical defects. On the latter basis it is virtually impossible to find a completely normal individual. This fact has been determined by physical examinations made in the army and by mass preemployment examinations as well as by studies of school children. In a study that I made of 6,565 male and female workers, only 7 per cent were found to be free from gross defects detectable by physical examinations, 70 per cent had minor defects, 16 per cent had advanced minor defects and 7 per cent had major defects.²

Nor does freedom from symptoms constitute a proper basis for defining the normal person. Autopsy reports frequently establish the fact that many individuals who have never suffered any subjective symptoms or physical signs of disease may present evidence of advanced cardiovascular disease, tuberculosis or other serious systemic diseases.

No matter what attempts are made to evaluate standards of physical fitness, social judgments generally complicate the point of view. The term normal, therefore, implies a personal judgment in which we use ourselves as the standard and the subject of our attention as the deviation from that standard. It represents, therefore, a series of physical and psychologic traits, the evaluation of which is influenced by social prejudices and attitudes.

SUBSTANDARD OR PHYSICALLY UNFIT

The presence of physical defects is frequently presumed to imply limitation of capacity to work. This premise may be true in some cases, but it is false in the majority of instances. Even in the presence of a serious physical defect, sufficient function may remain to carry on required industrial activity. Anderson's study³ of more than 4,000 physically handicapped individuals engaged in 635 different types of work shows the versatility of these individuals as well as the fallacy of thinking that because a man is physically handicapped he is functionally handicapped. The studies of the Western Electric Company⁴ covering a group of 685 men and women with physical defects show that the handicapped workers were as fully productive and showed no greater loss of time for sickness, accidents or personal reasons. In a study made by the Swiss National Accident Insurance Fund⁵ for the period 1930-1934 95,000 accidents were analyzed for the purpose of determining the influence of age on the frequency and cause of industrial accidents. The highest accident frequency was seen in the age groups 20 to 24 and 25 to 29, the ratio being 216 and 218 respec-

tively per thousand years of life exposure to accident risks. For workers from 40 to 44 the frequency rate dropped to 162 and for those from 45 to 49 to 148 per thousand years' exposure.

In the state of Connecticut⁶ more than 8,000 waivers have been signed by those suffering from physical defect of various sorts. The accident frequency rate in this group has been no higher than in the group which signed no waivers.

THE SAFETY FACTOR

The long list of outstanding characters in history, including the fields of literature, art, politics and military and industrial activity, illustrates the point that a disabled person may not only be normally productive but may actually excel in a chosen field.⁷ The ability of individuals with physical defects to be as fully productive as so-called normal individuals, that is those free from physical defects, is due largely to the safety factor.

The body can accommodate itself to unusual demands, despite disease or congenital or acquired defects, through physiologic resistance based on factors of safety in its own structure. Through self repair, regeneration, hypertrophy, adaptation to new conditions, vicariousness of function or substitution of one structure for another such as the skin for the kidney, the body is able to combat its environment and fight off harmful influences.⁸

The organic defect may even act as a stimulus to overcompensation of the total personality. Adler⁹ developed a complete system of psychology based on this idea of organ inferiority. He stated that we are equipped with materials that are rarely fully developed. Yet with this imperfect development good performances are turned out, just as our ancestors produced great works with imperfect tools. It is probable that a man equipped with defective organs, that is, with inadequate tools, will actually develop a better technic to combat the rigors of his environment. He will pay a great deal of attention to detail, devise more unerring shortcuts or may undergo a more intensive training.

OBJECTIVE CRITERIA OF PHYSICAL FITNESS

Viewed objectively, physical fitness may be regarded as the ability to perform productive and continuous work. The productive capacities of an individual may be said to depend on (1) native ability, (2) training and (3) the presence or absence of illness.

APTITUDE

Native ability or aptitude has been considered the key to the whole problem of physical fitness by educators, employers and personnel men who have devised various tests for the determination of these aptitudes. It is presumed that employees can be selected who will be most productive and least accident and sickness prone by testing them for such traits as concentration, observation, imagination, strength, endurance, speed, dexterity, quick grasp, kinesthetic discrimination, judgment and intelligence. Interest in these tests has been so popular that a bill¹⁰ has been introduced in the United States Senate for the purpose of providing means for the determination of physical fitness and aptitudes. By these tests it is hoped to determine what capacities the individual possesses or to what extent he possesses an unusual trait, talent or ability.

2. Unpublished data.

3. Anderson, R. N.: *The Disabled Man and His Vocational Adjustment*, New York, Institute for the Crippled and Disabled, 1932.

4. Odencrantz, Louise C.: *Experience in the Employment of the Handicapped*, *Rehabilitation Rev.* 6: 225-237 (Aug.) 1932.

5. Johnson, Ethel M.: *Added Compensation Hazards of Older Workers*, Swiss Experiences, U. S. Dept. of Labor Bull. 36, Washington, D. C., 1940, p. 107.

6. Personal communication to the author.

7. Wurtz, Hans: *Zerbrecht die Krücken*, Leipzig, 1932.

8. Meltzer, M.: *Factors of Safety in Prostatic Surgery*, New York M. J. 110: 942-944 (Dec. 6) 1918.

9. Adler, Alfred: *Understanding Human Nature*, New York, Greenberg, Publisher, Inc., 1928.

10. Bill S-4179, for the establishment of a national physical fitness institute in the Federal Security Agency.

CLASSIFICATION OF TESTS

Anatomic.—It would seem foolish to cast horoscopes on the basis of imaginary relations between physical development and capacity to work. Yet anthropologists and anatomists have used the form of the individual as a basis for classifying individuals for work. The relationship between the height when seated to the total stature, termed the thoracic coefficient, and the relationship between the weight and height of an individual, termed the morphologic coefficient, has been suggested by Amar¹¹ as a guide to the choice of workers fitted for a particular form of labor. Yet he admits that the formation of the body as an index is far from absolute, since adaptation is a factor of greatest importance. He mentions the fencer Kirschoffer, who did wonders despite his small stature. Amar divides individuals into four physical types, namely (1) the digestive type, (2) the muscular type, (3) the respiratory type and (4) the cerebral or nervous type. He implies correlative capacities for muscular and organic effort according to the specific physical type. Griffiths¹² describes twenty-four physical types in their adaptability to work. He details the work requirements for which these physical types may be adapted. Draper¹³ and others have also suggested the influence of constitutional physical make-up on the capacity for work. On the other hand, Harris¹⁴ does not agree that a high degree of correlation exists between physical development and physical efficiency. He believes there is no index of physical fitness or efficiency except the ability to do one's job and live to a ripe old age. The establishment of a false index will only produce inferiority complexes.

Physiologic.—From a scientific point of view, the capacity for work may be regarded as a mechanical concept and the human body as a machine capable of expending energy for the execution of certain work. Thus considered the useful mechanical work, the industrial effect, is a quantity which can generally be calculated without difficulty. The work done in ascending a mountain, a staircase or a ladder is the product of the weight of the body and the vertical height ascended. The work of a cyclist is the product of the distance covered and the passive resistance of rolling friction, and so on. The amount done by the arms and legs in operating tools or work done in locomotion can also be measured more or less exactly. However, this mechanical quantity is more difficult to measure when the movements are diverse and complicated because any static effort of the workman escapes the measurements, although the whole muscular activity consists of static efforts.

As a machine, the body is subject to the law of thermodynamics applicable to all machines. Every machine transforms energy. For example, the thermal energy of the coal in the boiler is transformed into electrical energy in the dynamo. In any motor the total expenditure of energy may be divided into the static expenditure needed to overcome the force of friction and the dynamic expenditure which corresponds to the useful work done. In inanimate machines the static expenditure is small compared to the dynamic expenditure, but this is not the case in the animal motor. The latter is always at pressure because if it ceased an instant

to be in that state life itself would be arrested. The static expenditure in the human motor is an active and permanent process because it is determined by physiologic needs. This difference between inanimate and animal machines is a factor which has been seriously overlooked by investigators who have interpreted the human body as a machine and who have established certain indexes of its function.

Estimates of physical fitness are frequently based on tests of muscular strength. Police departments use these tests frequently in determining the fitness of applicants for police duty. This factor may be measured by two methods, the ergographic and the dynamometric. In the first, following the classic method of Mosso, the arm or leg is made to perform a piece of work such as rotating a wheel by the hand or pushing a pedal with the leg. The work done is measured according to the mechanical formula the product of the force and the distance from which it is applied. The fallacy of this method is that it depends on fatigue as an index of the amount of work performed. Unfortunately there is no method by which fatigue can be measured. Lee¹⁵ has definitely shown that no test has been devised, be it chemical, physiologic or psychologic, that can measure fatigue.

The use of the spring dynamometer in the determination of physical strength is fraught with error because of the mechanical construction of these appliances. The force of single muscular contractions on deformable springs is used in tests of muscular efficiency. The grip dynamometers of Collins and Smedley are commonly employed. As tested in a large series of cases it was found that the size and shape of the hand, as well as the previous trade and experience, were more important than intrinsic muscular strength in the determination of the results.

The spring balance is a more accurate instrument in determining the muscle strength of individual muscle groups. However, muscular activity is a complicated act and the effectiveness of muscle action depends not only on intrinsic muscular strength but on neuromuscular activity as well. The effectiveness of the blow of a prize fighter will depend on strength plus split second timing and accurate localization of the target. These factors are the result of training. While it is conceivable that, in a single vocation, a job analysis can be made of the muscular strength requirements, it would be almost impossible to include the hundred and one auxiliary muscular acts accompanying specific tasks. Furthermore, these tests omit the important factor of adaptation and training in overcoming primary strength deficiencies.

Tests of cardiovascular efficiency have been frequently used to determine physical fitness. The pulse rate and blood pressure are taken before and after exercise and compared to arbitrary normals. It is assumed from these tests that the results represent the efficiency of the body in its adaptation to work. Schneider,¹⁶ Scott¹⁷ and Crampton¹⁸ have devised indexes of physical efficiency based on these factors. But these formulas are false since they do not evaluate the whole body but select and abstract only a small part of it. Furthermore, they fail to take into account the safety factor, while the

11. Amar, Jules: *The Human Motor*, New York, E. P. Dutton & Co., 1920.

12. Griffiths, H. Ernest: *Injury and Incapacity*, New York, William Wood & Co., 1935.

13. Draper, George: *Human Constitution*, Philadelphia, W. B. Saunders Company, 1924.

14. Harris, H. A.: *Anatomical and Physiological Basis of Physical Training*, Brit. M. J. 2: 939 (Nov. 11) 1939.

15. Lee, F. S., and Vanbuskirk, J. D.: *An Examination of Certain Proposed Tests for Fatigue*, Am. J. Physiol. 63: 185 (Jan.) 1923.

16. Schneider, E. C.: *A Cardiovascular Rating as a Measure of Physical Fatigue and Efficiency*, J. A. M. A. 74: 1507-1510 (May 29) 1920.

17. Scott, Verner T.: *The Application of Certain Physical Efficiency Tests*, J. A. M. A. 76: 705-707 (March 12) 1921.

18. Crampton, C. W.: *Blood Ptosis: A Test of Vasomotor Efficiency*, New York M. J. 98: 916, 1913.

entire hypothesis underlying their use is based on the fallacious concept of man as a machine.

Spirometry has been used to determine pulmonary and cardiac efficiency.¹⁹ These vital capacity tests are also frequently employed in physical examinations in industry. In one lead plant, one of the main requirements for passing the physical fitness test on the part of applicants was a high vital capacity reading. It was assumed that such an individual would have a strong constitution and a strong resistance toward the development of lead poisoning. Nevertheless the incidence of lead poisoning was higher in the group with the high vital capacity reading, since the volume of inspired lead-containing dust was much greater in this group than in those with a lower vital capacity.

Psychologic.—Psychologic aptitude tests have received considerable attention in the measurement of intelligence and especially in the field of vocational guidance.²⁰ They have assumed such a popular acceptance transcending their real value that it has been difficult to avoid the accusation of phrenology, clairvoyance and fortune telling leveled at those engaged in this field.

There are many fallacies underlying their use: (1) the mechanical concept underlying these tests, namely, comparing the body to a machine; (2) the selection of comparatively few traits out of many thousands to represent the total physical and mental personality of the individual; (3) the difficulty in separating native ability from training, so that what is really being measured is a compound of the two; finally, and most important, (4) the assumption that there are great differences between individuals.

But do men really differ so enormously from one another as to place such great reliance on these tests? Do these differences, if they exist, obtain for the entire span of human capacities or are they encountered only in such special fields as, for example, those of mathematical or artistic ability or ability to pilot a plane? How much more productive is the most efficient individual than the least efficient in a given occupation?

Range of Human Capacities.—Many of the answers to these interrogatories have been provided by a study of the range of human capacities made by Wechsler.²¹ In this study are included the bulk of available data up to 1933, comprising studies of linear traits, body circumference, metabolic rates, physiologic functions, motor functions, and perceptual and intellectual abilities. Wechsler has shown that for the same age group there are little differences in human capacities. He has furthermore demonstrated that the total range ratio between the least productive and the most productive individual, as revealed by the existing available data, is not greater than 2 to 1. For example, in an industrial plant where disks were being strung this ratio was 2.12 to 1. In another operation, namely the speed of inserting bolts, the ratio was 2.09 to 1. In still another operation, that of card sorting, the ratio was 2.50 to 1. In the high jump the ratio was 2.01 to 1. In the broad jump the ratio was 2.07 to 1. In the upper limit of audibility the ratio was 2.09 to 1. These differences in performance are indeed small and are especially significant if it is remembered that they are a compound of native inherent ability and training.

TRAINING

Productivity depends not only on native ability but also on training. Much of the capacity which is being measured represents acquired knowledge, experience or actual instruction in general or special skills. While these may be measured, it must be understood that equal opportunity exists for the development of capacity to work based on training.

ILLNESS

I have already said that minor physical defects do not influence productivity. I am, of course, referring to static defects, as short stature, underweight, a stiff elbow, amputation of a finger or leg, leg shortening, or paralysis of a hand. Accommodation to these static defects may be sufficiently adequate to make the individual fully productive. The leg amputee can perform seated or standing work. Paralysis of an arm may still permit the individual to work as a draftsman or as a salesman.

Illness, however, is dynamic and not static. Tuberculosis, syphilis, arthritis or any infectious or degenerative systemic disease will affect productivity by influencing perceptual intellectual and motor functions. The detection of these illness states by complete and thorough physical examination is of definite and constructive value.

CONTINUITY OF WORK

Physical fitness depends not only on the capacity to be productive but also on the assumption that this productivity is not interrupted. Continuity is disturbed by loss of time. Absenteeism is important economically to industry and also to military service.

Loss of time is incurred because of so-called personal reasons, accident and illness. There is no way of protecting against loss of time because of personal reasons. Studies of accident proneness by the Industrial Fatigue Research Board have produced only equivocal results.²² Lanza and Vane²³ support the observation that sickness prone individuals exist. Although they constitute a small percentage of total employees they account for an inordinately large number of lost days due to illness. Lanza and Vane report that rigid standards of pre-employment physical examination are not the solution, since even in such highly selected groups as the military service noticeable degrees of absenteeism are encountered. There is, however, a high degree of correlation between sick absenteeism and the presence of serious organic illness or profound emotional instability. Hence complete and thorough physical examination will materially help to reduce lost time from these causes.

SUMMARY

Physical fitness is a socio-economic concept involving the social evaluation of a series of anthropologic, physiologic and psychologic traits. It becomes a medical concept in the presence of physical defect. Here the physician also derives a social judgment (ability to work) out of pathology. Pathology determines the nature of the illness or defect but not the extent of the remaining health or the extent of adaptation of the remaining functions. A person lives not only with his pathologic lesion but also with the remaining undisturbed organs and functions.

Physical fitness in its widest sense is the ability to perform productive and continuous work. This fitness is based on native ability, training and the presence or

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20. Spearman, C. E.: *The Abilities of Man*, New York, Macmillan Company, 1927.

21. Wechsler, David: *The Range of Human Capacities*, Baltimore, William Wood & Co., 1935.

22. Vernon, H. M.: *Health in Relation to Occupation*, New York and London, Oxford University Press, 1939.

23. Lanza, A. J., and Vane, R. J.: *Absenteeism in Industry*, Bull. 4, Medical Series, Air Hygiene Foundation, Pittsburgh.

absence of illness. The determination of these factors by physical examination is of limited value except as it may detect gross illness states or profound emotional instability, which are liable to influence productivity and continuity of industrial and military service. Static defects should be separated from illness states and their limited effect on working capacity properly evaluated. Rejection should be based on the presence of organic disease and not on static defects, except where job analysis in a specific vocation indicates unusual physical requirements. The popular notion that wide variations in individual capacities to work exist should be reconsidered in the light of Wechsler's data. Finally, in the determination of physical fitness by means of the physical examination, the physician should bear in mind that the average man can do the average job.

53 Lincoln Park.

THE EFFECTS OF REPEATED ANOXIA ON THE BRAIN

A HISTOPATHOLOGIC STUDY

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The effect of oxygen deprivation on the nervous system, and particularly the brain, has become a problem of great practical significance in recent years. The rapid progress of aeronautical engineering with the production of planes with high ceilings and rapid rates of climb has brought many of these problems to the fore. Another situation, only numerically less important, exists in the industrial and physiologic laboratory in which experimenters subject themselves repeatedly to conditions of oxygen lack. These two examples of repeated anoxia stimulated the initiation of the work reported here, in which an attempt was made to determine in guinea pigs and cats the nature and extent of the histopathologic changes which may occur in the brain after a single and after repeated periods of pure anoxia.

In order to function properly, the nervous system must have an adequate oxygen supply. There are several avenues open to explain this fact, and it is probable that no one approach alone is entirely adequate. One of these avenues is a consideration of the effects of oxygen lack on isolated parts of the nervous system. The effects of anoxia on small units of the nervous system have become known but recently. Lehmann¹ has shown that an excised nerve (which consists of the elongated processes of nerve cells) when deprived of its oxygen supply by immersion in an atmosphere of pure nitrogen demonstrates a typical sequence of irritability changes. This consists of an initial lowering of the threshold of excitability, followed by progressive failure of irritability of the nerve fibers. If the oxygen deprivation does not exceed certain time limitations, the nerve may be restored to its former functional state by allowing it access to oxygen. A similar succession of events in a natural situation was noted by Thorner and Brink² when the human ulnar nerve was deprived

of its circulation, which created, among other consequences, an anoxic state for a period not exceeding thirty minutes. The change in the functional state of the nerve, shown by the changes in threshold excitability, is reversible when the circulation has been restored. The synaptic junction of neurons is also deeply affected by oxygen deprivation. Bronk, Larrabee and Gaylor³ have shown that cutting off the oxygen supply to the stellate ganglion of the cat causes a progressive failure of the ability of the synaptic structures to transmit impulses. This effect too is reversible if the period of anoxia has not been too prolonged.

Similar functional changes have been observed in the central nervous system, as the spinal cord⁴ and brain. In these cases, either excitability or conductivity, or both, is taken as an index of the functional state. Gerard⁵ in a study of anoxia and neural metabolism, suggested that one of the functions of oxygen is to keep the cell membrane polarized and that complete anoxia initiates proteolytic processes in neurons. This reaction may occur partly as a result of accumulation of lactic acid in the anoxic state. Gellhorn⁶ believes that anoxia and hypoglycemia are very much alike in their physiologic effects as they act synergistically in the production of convulsive seizures.

A second avenue of approach to the problem of anoxia and the nervous system is the observation of the partial or total behavior of man and the intact or specially prepared experimental animal during oxygen lack. McFarland⁷ has made extensive psychologic studies into the general behavior of individuals breathing air in which the oxygen partial pressure has been reduced. Another opportunity in this type of study is provided by the present trend in the shock therapy treatment of schizophrenia by short periods of oxygen deprivation.⁸ Bentley⁹ approached the problem similarly. McFarland and others¹⁰ have confined their observations to changed reactions in circumscribed parts of the central nervous system, such as the central visual fields during anoxia and the ocular movements while reading. Jokl¹¹ has reported changes in the tendon reflexes during periods of anoxia. Most of these observations are concerned with the functional changes occurring during the anoxic period. Relatively little work aside from the observation of shock treated schizophrenic patients has been done with reference to the possibility of residual changes in the function of the nervous system as a whole after periods of anoxia. For the practical reasons cited in the opening paragraph, this is obviously worth investigation.

A third avenue of approach is the gross and histopathologic examination of the nervous system which

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8. Himwich, H. E.; Alexander, F. A. D., and Lipetz, Basile: The Effect of Acute Anoxia Produced by Breathing Nitrogen on the Course of Schizophrenia, Proc. Soc. Exper. Biol. & Med. 30: 367 (Nov.) 1938.

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From the School of Aviation Medicine, Randolph Field, Texas, and the Laboratories of Neurology and Neurosurgery, University of Pennsylvania School of Medicine, Philadelphia.

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has experienced anoxia either alone or in combination with other factors. These morphologic studies yield evidence of structural change which, by inference, may be associated with functional change. It remains entirely possible that many sorts of functional disabilities may occur in which our present arbitrary methods of histopathologic technic may yield no valid information. The pathologic effects of cerebral anemia (which introduces other factors as well as reduction in oxygen supply) have been studied by Gildea and Cobb.¹² These authors found nonspecific cortical lesions such as focal areas of necrosis and both swollen and shrunken ganglion cells. The appearance of focal areas of true necrosis may require a lapse of twenty-four hours after an anemic period, but degenerative changes in the ganglion cells may occur almost immediately. The large and small ganglion cells were most sensitive. More recently Weinberger and the Gibbons¹³ produced a temporary period of anemia by occlusion of the pulmonary artery. They found permanent severe pathologic changes in the cerebral cortex of the cat after an anemic period of three minutes and ten seconds, while longer periods of occlusion of the pulmonary artery produced, in addition, lesions in the Purkinje cells of the cerebellum and in the nerve cells of the basal ganglions. Studies on ani-

rather than to the concomitant factors in anemia. Some of these factors have been indicated by Sugar and Gerard.¹⁴ In this group belong hypoglycemia, hypercapnia and disturbances of intracellular and extracellular ionic balance.

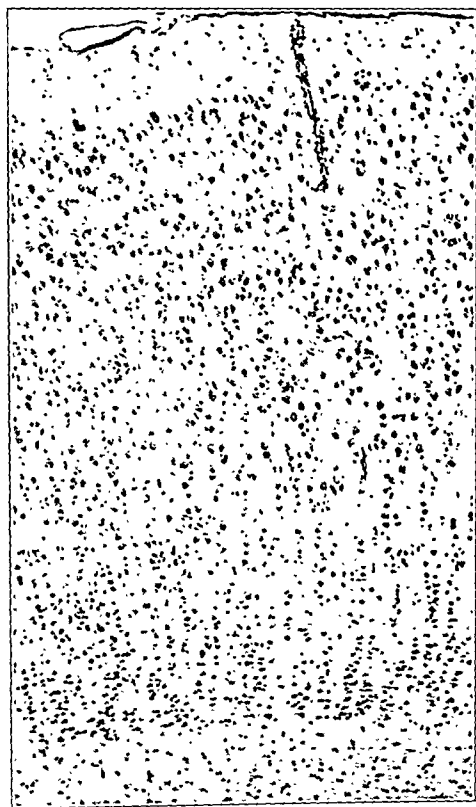


Fig. 1.—Section of brain cortex of guinea pig 9 immersed for fifteen seconds in nitrogen and decapitated thirty minutes later. This is a normal cortex showing normal architecture and well stained cells. (Cresyl violet stain; reduced from a photomicrograph with a magnification of 130 diameters.)

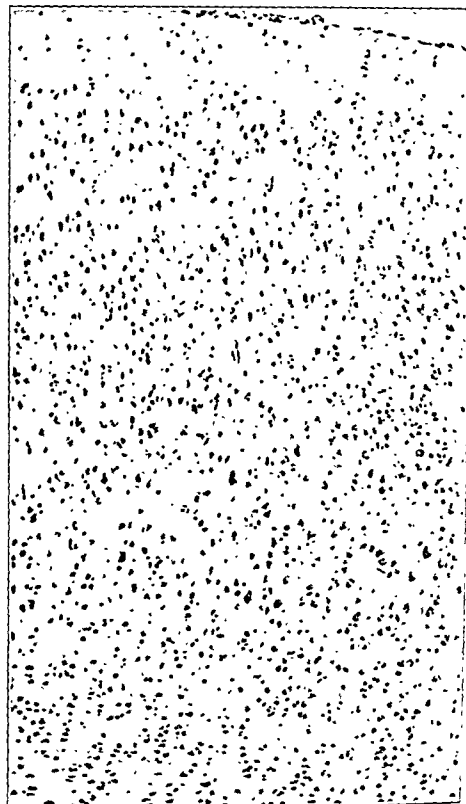


Fig. 2.—Section of brain cortex of guinea pig 10 immersed for thirty seconds in nitrogen and decapitated thirty minutes later. The nerve cells are insufficiently stained, the glia nuclei pyknotic. However, the damage is of metabolic rather than of structural nature, because silver impregnated slides show that the number of nerve cells is not visibly decreased. (Cresyl violet stain; reduced from a photomicrograph with a magnification of 130 diameters.)

Mechanical stoppage of the circulation to produce anemia has been supplanted by other methods. Crile and Dolley¹⁵ used pharmacologic methods to effect cardiac stoppage and resuscitation, while Batelli¹⁶ produced the same effects with electrical currents. The pathologic changes of the brain have been studied after various pharmacologic insults the main effects of which have been attributed to anoxia. Fatal cases of nitrous oxide-oxygen anesthesia have been described by Löwenberg, Waggoner and Zbinden,¹⁷ as well as by Courville.¹⁸

In these cases too in which death sometimes followed narcosis immediately, lesions of the cortex and basal ganglions predominate. These authors believe that anoxia is responsible for the changes observed. Carbon monoxide poisonings are of interest in this connection as they deprive the blood of its oxygen carrying capacity. Here again it may be questioned whether the

mals whose circulation is decreased introduce factors other than anoxia, and there is no evidence that the changes so produced may be due entirely to anoxia

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18. Courville, C. B.: The Pathogenesis of Necrosis of the Cerebral Gray Matter Following Nitrous Oxide Anesthesia, *Ann. Surg.* 107: 371 (March) 1938.

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cerebral changes in carbon monoxide intoxication are not caused in part at least by factors other than anoxia. In brief, we have found no record of investigations testing the influence of pure anoxia on morphologic changes in brain structures.

METHOD AND DATA

In order to study the effectiveness of anoxia without the introduction of complicating factors, it was decided to utilize the simple expedient of placing the experimental animals in an environment of practically pure nitrogen for various periods of time. The animals used were guinea pigs and cats. These were placed individually in containers with a glass top for observation. The containers could be flushed with a constant stream of nitrogen from a pressure tank. At the end of the period of immersion the animals could be removed and placed in the air. Since many of the animals became apneic during their immersion in nitrogen, artificial respiration had frequently to be used. It is a fortuitous fact that the heart beat continues and usually increases in rate both during these immersions and for minutes after an animal has become apneic. Because of the functional integrity of the circulation during these experiments, it may be stated that there is no significant factor other than anoxia introduced in these experiments. Of the

of the nervous system in anoxia when these secondary effects are excluded.

Guinea pigs immersed in an atmosphere of nitrogen behave in a somewhat stereotyped manner. There is usually an almost immediate increase in the respiratory

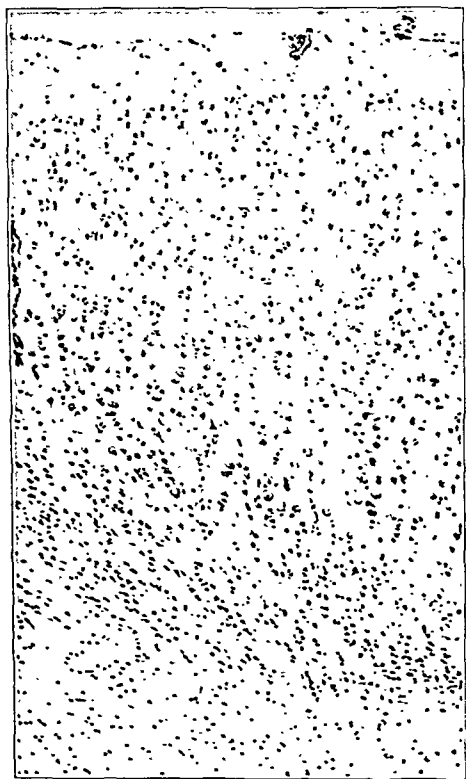


Fig. 3.—Section of brain cortex of guinea pig 11 immersed for sixty seconds in nitrogen and decapitated thirty minutes later. More extensive and intensive damage of the same type as in figure 2. Some large nerve cells in the deeper cortical layers are swollen, the nucleus is retracted and the cytoplasm is almost or completely unstained. The appearance of some nerve cells suggests permanent damage. (Cresyl violet stain; reduced from a photomicrograph with a magnification of 130 diameters.)

changes observed, many may be the result of factors which are secondary effects of anoxia, but the data apparently validly indicate the relation between structural brain damage and anoxia of the total animal. For this reason the results may not correspond to a synthetic picture derived from the study of isolated parts

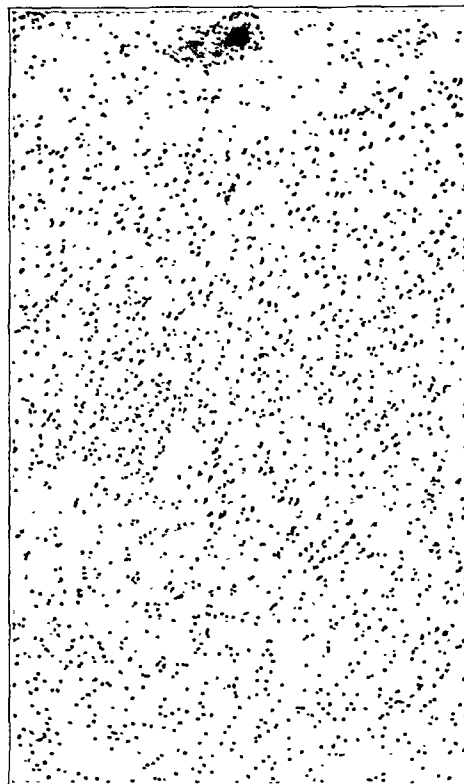


Fig. 4.—Section of brain cortex of guinea pig 5 immersed twenty-four times in nitrogen. The animal died forty-eight hours after the last immersion. The difference between this cortex and that represented in figure 1 is striking. Although here is true what has been said in reference to figure 2, namely that many more cells are present than are stained with basic dyestuffs, a marked number of nerve cells are permanently damaged. Subpial hemorrhage. (Cresyl violet stain; reduced from a photomicrograph with a magnification of 130 diameters.)

rate. In from ten to fifteen seconds the animal becomes very active. In another twenty seconds the animal shows some arching of the neck and then slumps to the floor of the container. The retinal light reflex, ear, tongue and mucous membranes appear cyanotic. Spasmodic movements may be seen, varying from isolated clonic twitching to generalized convulsions. If the animal is immersed for more than one minute, it is usually apneic when removed and must be given artificial respiration. The majority of pigs immersed in nitrogen for 105 seconds cannot be revived. In no case did the heart beat cease before respiratory failure.

Cats immersed in nitrogen can be observed to exhibit the same symptoms, except that the time scale is longer.

The time required for recovery from anoxia varies with the length of the anoxic period and may extend over some hours in cats. In some animals death occurred directly from prolonged anoxia; in others death occurred many hours after seeming recovery from an anoxic period. A last group of animals was killed by decapitation after one or more anoxic periods. Many animals underwent repeated periods of anoxia. None of the animals developed unusual behavior or showed neurologic signs as a residuum. Complete gross and microscopic studies of the brain were made on all animals.

In general, the animals may fall into five groups:

GROUP 1.—*Animals rendered anoxic for various periods of time and decapitated within one-half hour of removal from the chamber.*

Animals (9, 10 and 11) kept for fifteen, thirty and sixty seconds, respectively, in nitrogen and decapitated thirty minutes later. The three animals were litter mates and albinos.

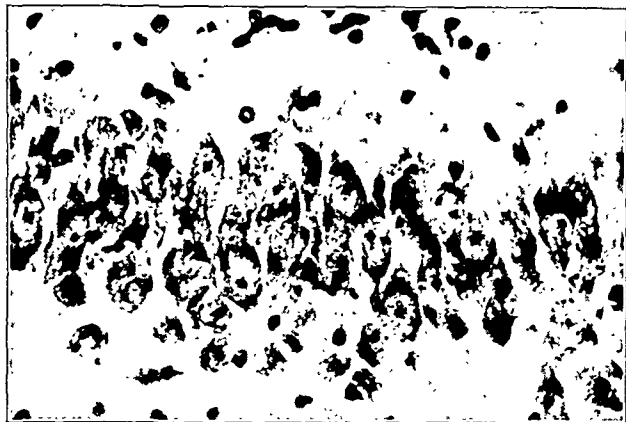


Fig. 5.—Section of fascia dentata of Ammon's horn of the animal decapitated after having been immersed in nitrogen for fifteen seconds, showing normal architecture and appearance of cells. (Cresyl violet stain; reduced from a photomicrograph with a magnification of 550 diameters.)

The brain of the animal immersed for only fifteen seconds seems to be normal (fig. 1). One is impressed by the great number of cortical nerve cells and their well stained appearance. There are some congested blood vessels and a few miliary hemorrhages over the cortex, but this plays a negligible role compared with the good preservation of cortex, Ammon's horn (fig. 5), cerebellum, basal ganglions and brain stem.

With longer immersion of the animals, the cell changes become slightly more marked, are patchy in distribution (fig. 2) and become more diffuse after sixty seconds of anoxia (fig. 3). Fresh perivascular hemorrhages are more frequent, and in the white matter perivascular areas of coagulation appear. The blood vessel wall is more darkly stained in some of them and not stained in others. In general there seems to be a tendency to increasing severity of tissue damage with prolonged time of immersion. However, the degree of damage cannot be judged from cresyl violet stained sections. Silver impregnation and hematoxylin show that the cell damage is of a chemical rather than of a structural nature. Many more cells are still in existence than take basic dyestuffs, though there is no doubt that some cells are permanently damaged with anoxia of sixty seconds' duration.

Conclusion.—Anoxia of fifteen seconds' duration does not produce visible damage to brain cells. Anoxia of thirty seconds' duration is followed by metabolic changes and anoxia of sixty seconds' also by morphologic changes in the cortical nerve cells. In the last group, in addition, subpial and intracerebral perivascular hemorrhages and coagulation were found.

These observations indicate that sublethal periods of oxygen deprivation produce damage to cortical cells, which becomes readily apparent if the animals are permitted to survive for one-half hour. The time of immersion in oxygen necessary to produce such changes is between fifteen and thirty seconds. Almost certainly many of these changes are reversible. In addition to the degenerative changes in cortical cells there are congestive and hemorrhagic blood vessel phenomena which appear even in the animal which was immersed in nitrogen for fifteen seconds. Presumably sufficient damage to the smaller units of the vascular tree may affect cerebral neurons as a secondary factor.

GROUP 2.—*Animals killed in nitrogen directly with no recovery period.*

One guinea pig (1) and one cat (7) killed in nitrogen directly.

These animals show subpial hemorrhages and some vague nerve cell changes. The cortical architecture is normal, as are Ammon's horn, Purkinje cells, ependyma and blood vessels.

Conclusion.—The brain of animals killed directly in nitrogen is almost normal aside from subpial hemorrhages.

In contrast to the animals of group 1, in which the animals were permitted a short survival period, the circulatory and degenerative changes observed in group 2 are relatively slight. The actual damage to cerebral tissue in animals killed by anoxia should certainly be greater than in those subjected to sublethal anoxia, but it appears that a survival period is necessary for the change to become histopathologically apparent.

GROUP 3.—*Animals killed in nitrogen following repeated sublethal exposures at different days.*

One guinea pig (2) was killed in nitrogen after nine periods of anoxia, another (6) after twelve periods.

These animals showed a great number of subpial hemorrhages over the convexity and base of the brain. The pia was slightly thickened and contained an increased number of fibroblasts. The type of nerve cell changes was the same as in group 1 but the degree of the disease was more severe. The nerve cells of the deep cortical layers of Ammon's horn and the subiculum were pale, their nuclei shrunken and pyknotic, the cytoplasm of foamy appearance. Foci of blanching were present in the cortex, possibly in connection with fibrosis of the small arteries. In larger arteries the media was rich in fibroblasts and incrustated with a granular material giving the reactions of calcium.

Conclusion.—With repeated periods of anoxia the nerve cells become more severely damaged, and some cells disappear completely. The meninges and blood vessel walls show signs of fibrosis and incrustation.

In this group of animals the additional picture of the permanent damage following repeated anoxic exposures was seen. Apparently some of the changes seen in the animals in group 1 were irreversible, and these irreversible changes sum up to provide the pictures of extensive and permanent damage when the animals are repeatedly subjected to anoxia.

GROUP 4.—*Animals dying hours after nitrogen immersion.*

Animals dying spontaneously from eight to forty-eight hours after one or repeated immersions into nitrogen (12, ten hours after one immersion; 3, eight hours after twelve immersions; 5, forty-eight hours after twenty-four immersions at different days).

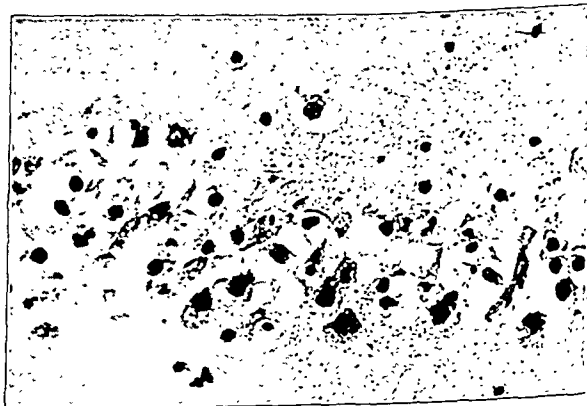


Fig. 6.—Section of fascia dentata of Ammon's horn of the animal that died forty-eight hours after the last of twenty-four exposures to nitrogen, showing ischemic cell necrosis. (Cresyl violet stain; reduced from a photomicrograph with a magnification of 550 diameters.)

The cortex of these animals was markedly damaged. The nerve cells showed a small pyknotic nucleus retracted from the cytoplasm, of which only a marginal zone was stained with basic dyestuffs. The cortex seemed to be devoid of ganglion cells (fig. 4). However, here again silver and hematoxylin stained sections indicated that more nerve cells were present than were visible in the cresyl violet stained preparations.

This is a condition well known, for instance, from the encephalopathy following whooping cough and has to be considered, as already mentioned, as a chemical rather than a structural damage.

The nerve cell changes were most pronounced in the granular layers of the cortex, while both the Ammon's horn (fig. 6) and the Purkinje cells showed the typical picture of advanced ischemic disease. There was a mild proliferation of the ependymal cells and in one animal (12) a localized, mild meningitis with lymphocytic infiltration.

In one animal of this group the nerve cells of the basal ganglia and brain stem were involved in contrast to all other animals of this investigation.

Conclusion.—The animals of this group, although exposed for about the same period of time to nitrogen as those of group 3, were microscopically more severely damaged. This could be suspected from the fact that these animals died spontaneously. More cells were structurally and permanently damaged than in the former group, as exemplified by the almost necrotic condition of the Ammon's horn cells.

This group of animals represents a peculiar situation in which the animals are able to survive immediate periods of anoxia but die hours later. These animals were studied by a thorough general autopsy, and no significant extraneural lesions were found. While this situation generally occurred following the last of several periods of anoxia, one animal had only one exposure.

GROUP 5.—Animals decapitated after repeated anoxia.

Animals decapitated after seven and twenty-nine anoxic periods, respectively (cat 8 and guinea pig 4).

The changes in the cortex of these animals corresponded closely to those of group 4, indicating that the form of death has no influence on the type or degree of cell disease. In this group the granular layers were again greatly involved, in some convolutions more the outer, in others more the inner granular layer. While the cell degeneration was laminar in the guinea pig, it was patchy in the cat. This cat was the only animal that showed at least a suggestion of glial reaction.

The degree of nerve cell damage in the guinea pig which underwent twenty-nine periods of anoxia does not correspond to the frequency of anoxia. As far as can be concluded from the small number of animals, increased nerve cell damage runs parallel to the increased frequency of anoxic periods up to a certain point beyond which cell loss does not progress further. The Purkinje and Ammon's horn cells were ischemic approximately to the same degree as in group 4. The meninges and blood vessels showed mild fibrosis. The number of subpial and perivascular hemorrhages was not markedly increased, compared with those found in group 4.

Conclusion.—Decapitation after repeated periods of anoxia gives essentially the same picture as that seen in animals which die spontaneously after repeated periods of anoxia. The cell damage is laminar in the guinea pig and patchy in the cat. The cat is the only animal showing a suggestion of glia reaction, whereas the glia in all other animals seems to be damaged, together with the nerve cells. Cortical cell damage seems to progress with increased frequency of anoxia only to a certain point and then to lag.

COMMENT

Anoxia acts on ectodermal and mesodermal tissue alike in the brain of the guinea pig and of the cat. This action becomes visible first after immersion of the animal in nitrogen for one-half minute and is more marked after one minute. These initial changes are mainly of metabolic nature, the cell chemistry being so altered that the cytoplasm becomes unable to take basic stains such as cresyl violet. It is likely that most of these changes are reversible. This is not so with the perivascular hemorrhages and coagulations, which necessarily destroy minute portions of brain tissue. Hemorrhages indicate, in addition, a lesion of the wall of the blood vessel as demonstrated by its increasing fibrosis and incrustation. Hence a secondary noxious

factor appears after several periods of anoxia, namely the decreasing permeability of the wall of the blood vessel.

Integration of these two factors leads, after a greater number of anoxic insults, to structural and apparently permanent lesions in the cortical cells. The distribution of the cell lesions is irregular, in some animals more laminar and more pronounced in the granular layers, in others patchy and more marked in the pyramidal layers.

In all animals but one the glia appeared to participate in the suffocation and did not show any sign of proliferation.

The impression prevails that with increasing frequency of anoxia the alteration in the central nervous system rapidly reaches a maximum which seems not to be surpassed even in animals so severely hit that they die spontaneously some time after the last immersion.

It must be taken into consideration that the histologic picture conveys but a vague idea of the function of a cell. Even the complete disappearance of a number of cells gives no indication as to whether the available reserve of nerve cells is still able to maintain normal function or as to when they too will be exhausted. Be this as it may, one point stands out, and that is that metabolic changes are very early demonstrable in brain cells of anoxic animals and that with repeated attacks of severe anoxia more and more nerve cells perish.

In the majority of the animals here presented there is much evidence to suggest that repeated and short periods of anoxia may produce a summated picture of considerable permanent damage to the brain. However, the experimental procedure used (complete anoxia) would rarely be encountered in man, either in aviation, industrial or laboratory activities. Yet it would seem reasonable to believe that these degenerative and vascular changes may also occur when anoxia is only partial. Van der Molen¹⁹ states that at oxygen partial pressures slightly less than half that at sea level, and equivalent to that at an altitude of about 28,000 feet, cortical cell changes occur. Presumably, some of these changes may become permanent and the result of repeated exposures of this type may decrease the ability of the brain to operate efficiently and compensate adequately for the destroyed tissue. An interesting fact in this connection is the common observation among aviators, stressed by Armstrong,²⁰ that, as their air experience becomes longer, their ability to fly at high altitudes becomes less. Whether this is a function of increasing age or is due to repeated exposures to low oxygen environments is not clear.

The negative result of repeated sublethal experimental exposures of guinea pigs and cats to anoxia, as far as function is concerned, is in accordance with experience in man. This does not mean that there are no functional disturbances but that our present methods of examining men and animals are not appropriate to demonstrate their presence. In fact, it is likely that the application of modern sensitive neurophysiologic and psychologic methods would show deviations from the normal.

Yet the present experiments indicate that exposure to anoxia of increasing duration or repetition is followed by graded severity of damage to the nerve cells in brain and brain stem. Even one single period of

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anoxia of sixty seconds' duration leaves distinct traces of morphologic changes behind. There is no way of stating whether these damaged cells can recover. But the gradual increase of permanently damaged nerve cells and changes in the blood vessel walls, as well as in the meninges, points to the likelihood that no prolonged periods of significant oxygen lack leave the brain totally unscathed. The great reserve of nerve cells in the brain is probably responsible for the fact that functional compensation is possible for a certain time. However, this consideration should not allow one to overlook the organic sequelae of repeated though individually short lasting periods of anoxia, which, when summed up, may eventually lead to mental conditions comparable to those of the "punch-drunk" boxer.

SUMMARY

Exposures to sublethal periods of pure anoxia lead to vascular and degenerative changes in the brains of guinea pigs and cats. Some of these changes are irreversible and become summated in animals repeatedly subjected to anoxia. Because of quantitative differences in the extent of anoxia and the differences in species, these experiments cannot be translated directly to situations of oxygen deficit in man. Yet as demonstrating a general process these experimental results point to the possibility of a gradual lowering of the cerebral reserve in individuals repeatedly exposed to low oxygen environments.

THE EFFECT OF ALCOHOL ON
DRIVING SKILL

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AND
EDWIN FLETCHER
SAN FRANCISCO

One important step toward the solution of the problem of drunken driving lies in the accurate diagnosis of drunkenness. That a definite correlation between blood alcohol concentration and intoxication exists in any large series of cases has been repeatedly shown, and on the basis of data so obtained rigid limits of blood alcohol concentration above which legal intoxication is assumed to exist have been fixed by several states. These all agree more or less with the figure pronounced by the National Safety Council of 150 mg. per hundred cubic centimeters of blood.

The experimental data on which this pronouncement has been made leave something to be desired from the standpoint of control and objectivity. As a matter of fact the point most frequently lost sight of is that, while the correlation may be excellent from the statistical standpoint, in order that a man may be convicted of drunken driving because his blood alcohol concentration was found to be 150 mg. per hundred cubic centimeters it is essential that this blood alcohol concentration be shown to produce legal intoxication not in a majority of individuals but in every individual. Failing this, it is inevitable that certain convictions will be unfairly obtained. With this in mind it is of interest to inspect the data which have appeared in the medical literature.

Bogen¹ found a high degree of correlation between the breath and urine alcohol concentration of patients

and their degree of intoxication as judged clinically. With alcohol concentrations below 100 mg. per hundred cubic centimeters none were adjudged intoxicated, with 100 to 200 mg. 50 per cent were intoxicated, with 200 to 300 mg. 75 per cent were intoxicated and with 400 mg. and over "almost" all were intoxicated. From this he concluded that tissue alcohol concentration was the best single criterion of drunkenness. Yet the variation in tolerance to alcohol is apparent from his own figures, which show that at alcohol concentrations of from 100 to 200 mg. per hundred cubic centimeters half the individuals were intoxicated, while some few were not so diagnosed with over twice this concentration, and if we were to subscribe to the limit of 150 mg. per hundred cubic centimeters laid down by the National Safety Council at least 25 per cent of the patients would have been wrongly convicted of drunkenness on the basis of alcohol concentration.

Similar results were reported by Jetter² in 1,000 hospital entries. Considering only the extremes, he found 10 per cent intoxicated at a blood alcohol level of 50 mg. per hundred cubic centimeters and 93.3 per cent at 400 mg. per hundred cubic centimeters. Thus an occasional individual was not considered intoxicated at a blood alcohol concentration eight times as high as that at which 10 per cent were considered intoxicated. Smith and Stewart³ are more conservative, considering the test of value in determining how much alcohol has been ingested but not in the diagnosis of the degree of intoxication.

This variation in tolerance to alcohol, which has long been a matter of common knowledge, was demonstrated experimentally in dogs by Newman and Card⁴ and in man by Bahnsen and Vedel-Petersen⁵ and by Schmidt.⁶ The latter administered a dose of alcohol to a group of subjects and determined its effect on various acts requiring the same type of skill required in motor driving. Individual variation was well demonstrated, for, though the majority showed significant losses in performance, some subjects showed an increase in skill, possibly attributable to practice.

EXPERIMENTAL WORK

It seemed desirable that the test situation should conform as nearly as possible to that prevailing in the actual operation of a motor car. The subject sat in an ordinary adjustable driver's seat. In front of him, in the normal position, were the steering wheel, clutch, brake and accelerator pedals. Behind the steering wheel an aperture at approximately eye level represented the outlook through the windshield, and in this aperture appeared a facsimile of the radiator cap and hood of a car, the movement of which from side to side could be controlled by the steering wheel. Behind the radiator cap, filling the aperture, was a photographic scene depicting a three lane highway, in the right hand lane of which the rear elevation of a truck was apparent. This scene was actuated by an irregular cam so as to move with varying speed in an unpredictable manner from side to side behind the aperture, and it was the

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5. Bahnsen, Paul, and Vedel-Petersen, Kontorchef: Alcohol Studies: I. Experiments on Drivers of Motor Vehicles, *J. Indust. Hyg.* **16**:304 (Sept.) 1934.
6. Schmidt, Max: Alcohol Studies: II. Concentration of Alcohol in the Blood, *J. Indust. Hyg.* **16**:355 (Nov.) 1934.

Supported in part by a grant from the Rockefeller Fluid Research Foundation, University School of Medicine.
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1. Bogen, Emil: Drunkenness: A Quantitative Study of Acute Alcoholic Intoxication, *J. A. M. A.* **89**:1508 (Oct. 29) 1927.

objective of the subject so to move the steering wheel controlling the radiator cap that this object remained directly in line behind the truck. An electric stop-watch recording hundredths of a minute remained in motion as long as the alinement of radiator cap and truck was maintained, but as soon as a deviation of one-eighth inch either way occurred the clock stopped and a signal light in view of the subject on the side to which the

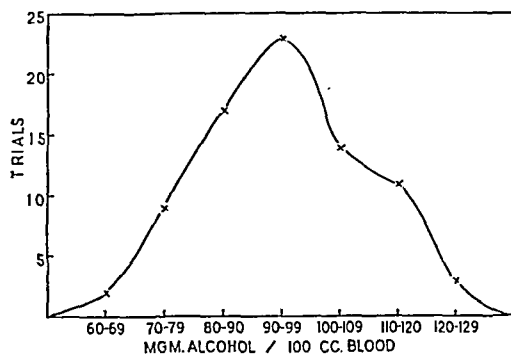


Chart 1.—Distribution curve showing the concentration of alcohol in the blood after ingestion of a dose of 1 cc. per kilogram of body weight in seventy-nine trials.

deviation occurred went on. On correction of the deviation the light went out and the clock restarted. Thus the percentage of time that alinement was accurate could be recorded. This test will be referred to as simple steering.

In the road scene, close beside the truck, were two small holes, behind one of which was a green light and behind the other a red light. Pressing on the accelerator pedal caused the green light to come on. At an unpredictable time thereafter the green light would go out and simultaneously a red light would appear and a stop-watch recording hundredths of a second would start. It was the object of the test to press on the brake pedal as soon as the red light was perceived, causing it to be extinguished and the clock to stop, recording the reaction time in hundredths of a second. This test will be called simple braking. The two tests could be operated simultaneously, and this procedure was designated vigilance steering and braking. All the figures reported represent the percentage loss in efficiency after alcohol, referred to the control score of the same individual before drinking. Thus for each individual we had a test primarily of coordination, simple steering, one primarily of reaction time, simple braking, and one combining the two factors and bringing in more strikingly the factor of attention, vigilance steering and braking.

Alcohol was administered in the form of commercial whisky, diluted to taste with carbonated water and imbibed in fifteen minutes. The routine of the test was as follows: A minimum practice period of fifteen minutes, preferably on a day prior to the actual test, was required. This was effective in minimizing the possibility of increase in efficiency due to practice. When the subject presented himself at the laboratory for the test he was given five trials of simple braking, followed by one trial of simple steering, then three trials of vigilance steering and braking, then five final trials of simple braking, one of simple steering and one of vigilance steering and braking. The values reported are averages of all trials. Immediately on the completion of this control series, which required about fifteen minutes, the alcohol was given, and at the end of one hour

a second identical series of tests was given and a sample of venous blood taken for alcohol analysis.⁷

Ninety-eight such trials were performed on sixty-five subjects, of whom eight were women. The subjects, all in good health, consisted mainly of physicians and medical students, with a few skilled workers, and was thus fairly homogeneous as to general cultural level.

The dose of alcohol was 0.5 cc. per kilogram on four occasions and 1 cc. on seventy-nine, while in ten subjects an additional 0.5 cc. was given after the completion of the first test, and in one subject still an additional 0.5 cc. after the second dose, making 2 cc. per kilogram in all. The distribution of alcohol concentrations after the 1 cc. dose is shown in chart 1.

Considering the whole mass of data, the correlation between various factors was calculated by the Pearson correlation coefficient formula, with which a correlation coefficient of 1.0 indicates perfect and 0.0 no correlation. Comparing blood alcohol concentration in our series with percentage loss in vigilance steering and braking, which was undoubtedly our best measure of loss in driving skill, we obtained a correlation coefficient of 0.485 plus or minus 0.077. When it is recalled that a slightly better correlation, namely 0.5, exists between the height and weight of a population, it readily will be seen that the correlation between loss of driving skill as measured by our tests and blood alcohol concentration is not very great, as is graphically represented in chart 2.

The crude scores in the tests showed less correlation with loss in efficiency than the percentage loss in the tests, the variation in skill from individual to individual often outweighing the changes brought about by alcohol. When distribution curves for simple steering and simple braking before and after alcohol are constructed, it is apparent that, while there is a definite shift in performance toward the poorer side in both cases, considerable overlap of the curves is present. However, it is of interest to note that in spite of this the crude scores of simple steering show a correlation with our best index of intoxication, loss in vigilance steering and braking, of 0.576 plus or minus 0.068, which is actually

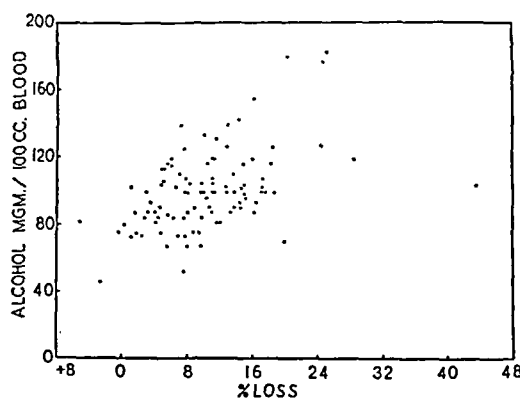


Chart 2.—Plot of percentage loss in efficiency in vigilance braking and steering against blood alcohol concentration for the entire group.

better than the correlation between loss of performance on the combined test and blood alcohol concentration. Thus it can be stated that performance in the test of simple steering is a better criterion of intoxication than is blood alcohol concentration and might be used profitably along with other tests in the diagnosis of drunkenness.

7. Newman, H. W.: The Determination of Ethyl Alcohol in Body Fluids, *J. Pharmacol. & Exper. Therap.* 56: 278 (March) 1936

An endeavor was made to break down the group as a whole into smaller groups of differing characteristics to determine possible variations from the general trend on this basis. No significant correlation was found between loss of efficiency from alcohol and the factors of age, sex, driving experience or drinking habits. With regard to the last of these, it should be noted that there were no really heavy drinkers in our series.

Several of the subjects made the statement prior to the test that in their opinion their driving skill was somewhat improved by moderate doses of alcohol, and a few felt that they did better in the test after drinking. It is of interest to note, therefore, that in no case was the performance in all the tests improved after alcohol. True, in seventeen of the trials there was improvement in one or more of the tests, but it is very probable that all these gains may be ascribed directly to practice rather than to any stimulating effect of alcohol, the gains being of the magnitude of those apparent in the control series.

COMMENT

The tests showed themselves to be well adapted to the demonstration of loss of efficiency in certain skills employed in the operation of a motor vehicle, giving consistent results in the same individual on different occasions. It was obvious that blood alcohol concentration in the individual case was a poor indicator of drunkenness as manifested by loss in skill in the acts tested, a fact in accord with the results of the previously published work cited. The important matter is to give full significance to this fact and not to carry over the apparent tendency for individuals with the highest blood alcohol concentrations to exhibit the greatest loss of skill into the arbitrary setting up of a fixed blood alcohol concentration at which a majority of individuals are intoxicated to apply equally to all individuals. If any blood alcohol concentration is to be accepted as absolute evidence of intoxication in the legal sense, it is essential that it be one at which experience has shown that no individual, regardless of his inherent or acquired tolerance, would be clinically adjudged sober. Concentrations lower than this might be of definite value as contributory evidence of drunkenness, but no more.

There can be little doubt that the operation of motor vehicles would be safer if the drivers were prohibited from consuming any alcohol whatever. However, the recent experiment with more generalized prohibition has effectively demonstrated the inability to enforce legislation so generally unpopular, whatever may be our opinion of the advisability of such laws. Public sentiment is definitely against the drunken driver but not against the drinking driver. Thus any attempt to control the problem by obtaining convictions on the sole basis of blood alcohol concentrations such as the 150 mg. per hundred cubic centimeters advocated by the National Safety Council must fail for the reason that such action would constitute the punishment of drinking rather than of drunken driving. Haggard,⁸ in defense of such measures, cites the speed limits imposed by most states as an example of legislation requiring all drivers to conform to standards safe for the least skillful of them. We are all familiar with the disregard for such laws shown by otherwise law-abiding citizens, so that rather than being an argument in favor of further legislation of the same type our experience

with arbitrary speed limits should point a lesson as to the public reception of similar laws in the future.

Rather should we look to the education of the operators of motor vehicles regarding the effect of alcohol on their driving abilities. For this purpose it is necessary that we amass data which will show that alcohol, even in moderation, does have a deleterious effect on the driving skill of most persons.

In spite of efforts at education, enforcement must always be a part of the campaign against drunken driving. For this to be justly and effectively carried out, two issues need to be clarified. The first of these is an adequate and uniform definition of intoxication as applied to drivers. The second is the development of tests which will establish the presence of this degree of intoxication. A rational procedure would seem to be the setting up of minimum standards of skill, as tested by as many procedures as possible, to be required of any person before he is allowed to drive a motor vehicle. A driver suspected of intoxication could then be retested, and if his performance fell below the accepted standard, and presence of alcohol in his blood was proved, a conviction should result regardless of the actual blood alcohol concentration found. Thus any person who so lowered his driving efficiency below the minimum accepted standard would be convicted, without penalizing other individuals of greater skill whose only offense consisted of the presence of alcohol in their blood stream.

BIOLOGIC FALSE POSITIVE SEROLOGIC TESTS FOR SYPHILIS

III. A SUGGESTED METHOD OF APPROACH TO THEIR CLINICAL STUDY

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Earlier papers of this series have drawn attention to the occurrence of biologic false positive serologic reactions for syphilis in normal persons¹ and in those with diseases or conditions other than syphilis.² For normal persons it has been estimated,³ on the basis of serologic surveys of large groups of presumably normal white American university students of both sexes, that the incidence of biologic false positive reactions in this particular population group is probably less than 1 in 4,000. As to diseases and conditions which may produce biologic false positive reactions, it has been further pointed out that their probable frequency is known, on the basis of published studies, only in yaws (100 per cent), leprosy (from 40 to 80 per cent), malaria (100 per cent at some time during the infection) and infectious mononucleosis (about 20 per cent). In diseases or conditions other than these no estimates of frequency are as yet possible, since the biologic false positive reaction in patients with acute infections is often only a transitory phenomenon, recognition of which may

From the Syphilis Division of the Medical Clinic, the Johns Hopkins University and Hospital and the United States Public Health Service.

1. Mohr, C. F.; Moore, J. E., and Eagle, Harry: Biologic False Positive Serologic Reactions for Syphilis: I. Occurring in Normal Individuals, to be published.

2. Mohr, C. F.; Moore, J. E., and Eagle, Harry: Biologic False Positive Serologic Reactions for Syphilis: II. Associated with Organic Diseases Other Than Syphilis, to be published.

3. Eagle, Harry: On the Specificity of Serologic Tests for Syphilis as Determined by 40,545 Tests in a College Student Population, *Am. J. Syph., Gonorr. & Ven. Dis.*, to be published.

8. Haggard, H. W.; Greenberg, L. A., and Cohen, L. H.: Quantitative Differences in the Effects of Alcoholic Beverages, *New England J. Med.* 219: 466 (Sept. 29) 1938.

depend not on single tests performed at random but on repeated tests, daily if possible, carried out during the entire course of the infection. Nevertheless, though estimates of incidence cannot be made, characteristic examples of biologic false positive tests have been reported² from our own clinic in acute infections of undetermined origin, acute infections of the upper respiratory tract (including pneumonia), vaccinia, infectious mononucleosis, rat bite fever and perhaps typhus fever. Within two or three years at least forty examples of biologic false positive tests, either in normal persons or in those with the diseases enumerated, have come under our personal observation, and twenty-one of these have been reported in the two papers already referred to.⁴

The recognition of such biologic false positive tests is of great importance, in view of the increasingly widespread use of routine serologic testing in medical practice, in industry and by legislative fiat (as in compulsory premarital and antepartum examinations). It is as thoroughly undesirable to make a diagnosis of and treat for syphilis a patient who does not have it as to miss the diagnosis in one in whom it exists. Every physician is familiar with the social and psychologic tragedies which may be precipitated by the diagnosis of syphilis, and every effort should be made to avoid false diagnoses.

Our concern in this respect, which has gradually increased during the past few years, is shared by others, notably Kahn,⁵ whose work on the subject will be mentioned presently.

In April 1940 one of us⁶ published a brief outline of a procedure for the attempted differentiation of biologic false positive serologic reactions for syphilis from those positive reactions actually due to the disease. It seems desirable, in view of the increasing importance of the subject, to amplify and expand this outline.

At the outset, it should of course be said that when a positive serologic reaction for syphilis is obtained in a patient who gives no history or shows no physical evidence of the disease the test should at once be repeated—and before the patient is told of the original result—in order to exclude a technical false positive result. This having been done, it is usually necessary to recheck both history and physical examination for actual clinical evidences of syphilis, since, unless the examiner has the possibility of syphilis in mind before the serologic reaction is first obtained, both are likely to be sketchily inadequate.

THE HISTORY OF SYPHILIS

It is common experience that a history of infection with syphilis is hard to obtain. Of patients with proved late syphilis of various types, at least one third of the men and one half of the women can give no story of early symptoms. As Stokes⁷ so well points out, this may mean that actually there were no early lesions, that the patient misinterpreted and dismissed as of no importance those which did occur or that he has really forgotten them. It may mean that the questions were asked in unfamiliar language rather than in the vernacular which the patient understands, that he was not questioned privately, that he was questioned in such a

manner as to imply that infection is inconceivable, or that a third degree tone was used. "No patient will admit ignominy, expressed or implied." Finally, it may mean that the patient was not asked about antisyphilitic treatment. A recent case comes to mind in which a careful examiner wrote on the patient's record "Denies syphilis by name and symptom" and was surprised to receive an unexpectedly positive serologic report and chagrined when a syphilologic consultant subsequently elicited from the patient (who had not intended to lie) a story not only of early syphilis but of three years' treatment for it, including seventy-two injections of an arsphenamine and sixty-one of bismuth, and two lumbar punctures!

When a history of infection with syphilis or of treatment for it is not obtainable, the risk of possible exposure should be asked for and noted. What story of premarital and extramarital sexual exposures can be elicited, and, if these occurred, were they infrequent and with social equals or promiscuous and with prostitutes? Is the patient married? If so, at least one contact can and usually must be examined for objective evidences of infection. Has the patient been married more than once? Such information as may be available concerning the former spouse's health and extramarital sexual habits should be obtained and, if dead, the cause of death. Has there been opportunity for extragenital infection, as in promiscuous kissing or, in the case of physicians, nurses and dentists, through professional exposure to syphilitic patients? Has the patient ever been infected with any venereal disease, especially gonorrhea? All these points are of collateral value in establishing the opportunity for infection with syphilis, if not its actual occurrence.

THE PHYSICAL EXAMINATION FOR SYPHILIS

A physical examination for syphilis is not complete unless it consists of thorough dermatologic examination (the patient stripped and the skin and mucosae carefully examined in good light), and thorough general medical and neurologic examination, including the use of the ophthalmoscope. The statement "There is no physical evidence of syphilis" is not acceptable unless at least this much has been done. When physical abnormalities are present, great care is sometimes necessary in their interpretation, as illustrated by two of our recent patients. One with herpes progenitalis and coincident pityriasis rosea had been elsewhere diagnosed as having primary and secondary syphilis; the other, with a retrosternal thyroid and perforation of the nasal septum due to chrome poisoning, had been thought to have syphilitic aortitis and a nasal gumma.

What serologic evidence of syphilis shall be accepted in apparently normal persons with no history of infection or of treatment for it? By and large, repeatedly positive serologic tests in a reliable laboratory, if confirmed by more than one standard technic (and especially if both a complement fixation and a flocculation procedure are used) mean latent syphilis in a person lacking history or physical evidence of the disease, provided there has been an opportunity for such infection to occur. Sometimes, perhaps often, it may be desirable to check the reliability of the laboratory by duplicate tests and by tests made in a different laboratory. Not only does this guard further against technical error but also a rare patient may, for unknown reasons, give consistently positive reactions in one laboratory and negative reactions in all others (Stokes has seen one such case, and one of us (J. E. M.) has seen another).

4. Mohr, Moore and Eagle (footnotes 1 and 2).

5. Kahn, R. L.: A Serologic Verification Test in the Diagnosis of Latent Syphilis, *Arch. Dermat. & Syph.* 41: 817 (May) 1940.

6. Moore, J. E.: A Suggested Method of Approach to the Recognition of the Biologic False Positive Serologic Test for Syphilis, *Bull. Genito-Inf. Dis.* 3: 1 (April) 1940.

7. Stokes, J. A.: *Modern Clinical Syphilology*, Philadelphia, W. B. Saunders Company, 1934, p. 61.

Quantitative serologic testing as a method of determining the validity of the serologic diagnosis of syphilis will be discussed in detail presently.

When shall serologic evidence of syphilis be doubted? As Stokes humorously puts it, there are "instances . . . in which one [positive] Wassermann test will convict a laborer over his own denial, two will make a case against a banker or a railroad president, but three successive positives will scarcely convince the medical adviser of the 'guilt' of a clergyman." True as this is, every physician has patients for whom, for entirely personal and mostly undefinable and intangible reasons, he is hesitant to accept a purely serologic diagnosis of syphilis.

Specifically, on clinical grounds, he is justified in suspecting as false a positive serologic result in at least two categories of patients: (1) young girls or young women who, lacking history or physical evidence of syphilis, have not been demonstrably sexually exposed (virginity should be objectively demonstrated in such cases by intactness of the hymen), and (2) persons of either sex and of any age who, also lacking historical or physical evidence of syphilis, are found to have positive reactions at an interval after one or more previously negative reactions and who deny exposure in the interim (examples of each of these categories are cited in one of the previous papers of this series¹).

On serologic grounds, one is justified in suspecting as false a positive reaction in a patient who, lacking historical or clinical evidence of infection and, whatever his history of potential exposure, gives a series of conflicting results when tested by different technics or at different laboratories.

SUGGESTED PROCEDURES WHEN BIOLOGIC FALSE POSITIVE TESTS ARE SUSPECTED

The diagnosis of syphilis is so potentially serious that whenever the suspicion of it arises every effort should be made to verify or deny it. When there is clinical or serologic reason to doubt a confirmed positive serologic report, a number of procedures, some clinical, some laboratory, should be instituted as aids in arriving at a conclusion. None of these procedures, taken alone, are definitive; the ensemble is usually necessary. The first has already been mentioned, i. e. an exhaustive anamnestic and physical search for evidences of syphilis itself. If, as is often the case, such a search is fruitless, one should proceed as follows:

1. Take a careful history as to (a) symptoms of some intercurrent infection of whatever nature, (b) serum treatment (including tetanus antitoxin) or (c) vaccination within the four months preceding the questionable serologic test. It must not be forgotten, as some of our illustrative cases show,² that a reagin-like substance may persist in the blood for several weeks or even months after recovery from certain acute infections.
2. Make a careful physical examination for evidences of acute infection preceding the questionable serologic test, with special reference to lymph nodes, spleen and lungs. The lymph node enlargement of infectious mononucleosis may persist for several weeks after the acute infection subsides, as may also basilar remains of an acute infection of the upper respiratory tract.
3. Make a thorough search of blood smears for malarial parasites. This is especially important in the Southern states, where malaria is endemic and chronic malarial carriers are common.
4. Examine blood smears for infectious mononucleosis. This may involve inspection of the smear and a

differential count by a trained hematologist. Abnormal cells of the lymphocytic series are especially important. The cytologic abnormalities of infectious mononucleosis tend to disappear promptly with subsidence of symptoms of acute illness (Bernstein³), and the smear may be normal at a time when the false positive serologic test persists.

5. Make a blood test for heterophile antibody (the Paul-Bunnell test). This is specific for infectious mononucleosis. Heterophile antibody tends to persist in the blood for from four to five months after the onset of acute symptoms of illness and gradually to disappear. It has been reported to persist for as long as six months (Bernstein). The disappearance of the positive serologic test for syphilis does not necessarily parallel the disappearance of heterophile antibody; the duration of the former is usually brief, but it may persist for as long as three months after recovery from illness.

In connection with paragraphs 4 and 5, it should be emphasized that infectious mononucleosis is almost certainly a much more common infection than it is usually thought to be. Its apparent prevalence among physicians, nurses, medical students and hospital employees is due only to the fact that such persons, being constantly in or near hospitals, are much more likely to have blood counts made for minor acute infections than are other patients. Further, it should be emphasized that the clinical manifestations of the disease are often trivial, consisting of no more than a day or two of slight sore throat with low grade and perhaps unnoted fever. Infectious mononucleosis is a possibility seriously to be investigated in all suspected false positive serologic reactions, especially in young persons.

6. Determine the sedimentation rate. The sedimentation rate is thought to be considerably increased in early syphilis and in neurosyphilis; it may be normal or, more frequently, slightly increased in late and in latent syphilis. Also it is frequently increased to an even greater degree in many of the acute infections, which may be responsible for false positive serologic reactions. In the latter, it tends to fall toward normal as the acute infection subsides; in syphilis, on the contrary, it tends to remain moderately elevated until some weeks after the institution of antisyphilitic treatment. A greatly increased sedimentation rate observed during an acute illness, which is accompanied by positive serologic tests for syphilis but which tends spontaneously to fall toward normal as acute symptoms subside, speaks moderately in favor of a biologic false positive serologic reaction. On the other hand, normal sedimentation rates may occur in normal persons with biologic false positive serologic reactions.

7. Repeat serologic tests for syphilis by several different technics including both complement fixation and flocculation, at least one of which is quantitatively titrated.

This requirement leads to a brief consideration of the value of serologic quantitation in the diagnosis of syphilis, a subject which has been considered in detail in another paper of this general series.⁴ In general, enormous variations in titer (from 0 to 1,600 units) are observed in all types of clinical involvement, including both early and late syphilis. On the average, the reagin titer is higher in early syphilis (100 + units) than in

8. Bernstein, Alan: False-Positive Wassermann Reactions in Infectious Mononucleosis, *J. M. S.* **196**:79 (July) 1938; *Infectious Mononucleosis*, *J. M. S.* **197**:85 (Feb.) 1940.
Eagle, Harry: The Value of Quantitative Serologic Tests, to be published.

any form of late syphilis (from 20 to 50 units). A single quantitative titration by any technic is therefore of no diagnostic value, since a low titer test is as likely to mean syphilis as a high titer test. In general, therefore, the only significance to be attached to a single titer test is in those patients, usually young, who, if infected with syphilis at all, have probably acquired the disease recently and who might therefore be expected to give high titer reactions.

Kahn¹⁰ has suggested that quantitative titration should be of value in differentiating false positive serologic tests from those positive tests actually due to syphilis, in that the former should be generally low and the latter generally high in titer. In our experience, the false positive serologic reactions occurring in normal persons¹ are usually low titer (from 0.5 to 5 units). Among persons suffering from diseases other than syphilis, far too little experience with serologic quantitation has accumulated to permit any conclusions as to titer in nonsyphilitic diseases, with the exception of leprosy, in which Wassermann titers are often high and flocculation titers usually low;¹¹ but enough information is contained in our own material² to indicate that even high titer reactions may be caused by still other nonsyphilitic conditions.

While a single quantitatively titered test is of no definitive value in differentiating false from true positive tests, a series of such tests over days, weeks or even months may be decisive. In general, if the positive reaction is false, it tends spontaneously to decrease in titer and finally to disappear. On the other hand, if the positive reaction is due to syphilis, it may, in the absence of antisyphilitic treatment, either spontaneously increase in titer (early syphilis) or remain at about the same level. In this connection it must be emphasized that serial quantitative titrations, to be of any value, must be carried out in the same laboratory by the same technic (preferably flocculation rather than complement fixation) and even then such tests are only roughly comparable, owing to unavoidable day to day variations in the sensitivity of the test.

As to serologic quantitation, then, the only value of a single test is that one may suspect as false low titer tests in young persons, who, if infected at all, may be presumed to have been recently infected and who should therefore have large amounts of serum-reagin.

The requirement that serologic tests be performed by several different technics necessitates another word of caution. Serologic tests vary in sensitivity both qualitatively and quantitatively. Qualitatively they may differ in the sense that in some cases a complement fixation test may be positive when more sensitive flocculation tests are negative. So far as our experience goes, such paradoxical results are largely confined to the following clinical categories:

(a) Patients with late congenital syphilis, treated or untreated¹² (the reason for this phenomenon in untreated late congenital syphilis is unknown).

(b) Patients with acquired syphilis who have had a great deal of antisyphilitic treatment.

(c) Infectious mononucleosis, malaria and perhaps other nonsyphilitic conditions.

Quantitatively, flocculation tests are in general more sensitive than complement fixation tests¹³ and may be divided into two groups: supersensitive screen procedures (Kahn presumptive, Kline exclusion) and less sensitive standard diagnostic procedures (Kahn, Kline, Hinton, Eagle). When several technics are used, the physician is justified in suspecting as false positive results which are paradoxically negative with more sensitive and positive with less sensitive technics.

8. Repeat serologic test for syphilis in several different laboratories of known excellence in order to rule out all possibility of technical error. Suspect as false tests positive in one laboratory, however, excellent, and negative in all others.

9. Perform the Kahn "verification test." This procedure, described by Kahn and his associates⁵ in several recent communications, depends on the fact that syphilitic reagin appears to flocculate the Kahn antigen best at 37 C., while the reagin-like substance present in the blood of many lower animals, of the occasional normal human being and of some patients with diseases other than syphilis flocculates best at 1 C.

In this connection it should be pointed out, however, that Kahn's work with this test is as yet on a small scale and has not been confirmed by other investigators. Until it rests on firmer ground than at present, a negative "verification test" should not be accepted as absolute evidence of the false positivity of other serologic tests.

10. Test the patient's serum by complement fixation with spirochetal antigen (the Reiter or Kazan strain of cultured *Spirochaeta pallida*). This test, known in Germany as Gaetgen's "palligen" test, has a considerable European literature. In this country Eagle has studied it,¹⁴ though unfortunately the antigen is not yet commercially available in the United States. There is reason to believe, however, that such spirochetal suspensions may give more specific results than tissue lipoids used in the Wassermann and flocculation tests, thus permitting the identification as false reactions of some of the positive results obtained in the absence of syphilitic infection. This is certainly the case in leprosy¹⁵ but is apparently not true in malaria.¹⁶ Other nonsyphilitic diseases have not yet been sufficiently studied to permit conclusions in this respect. Several of our apparently normal patients¹ as well as those with nonsyphilitic diseases² have, however shown negative results with a spirochetal complement fixation test while positive with standard technics, and we have laid some weight on this point in the final decision as to the validity of serologic results.

11. Test the patient's serum with wholly nonspecific antigens, such as those prepared from bacteria (the gonococcus, staphylococcus, tubercle bacillus) or from such substances as milk and lecithin. Certain persons apparently possess the peculiar property of reacting positively to all complement fixation tests. One such case has been reported by us (case 2).¹

13. Erickson, P. T., and Eagle, Harry: Spirochete Complement Fixation Reaction Compared with Eagle and Wassermann Procedures, *Ven. Dis. Inform.* 21: 31 (Feb.) 1940.

14. Eagle, Harry, and Hogan, R. B.: On the Presence in Syphilitic Serum of Antibodies to Spirochetes, Their Relation to So-Called Wassermann Reagin, and Their Significance for the Serodiagnosis of Syphilis, *J. Exper. Med.* 71: 215 (Feb.) 1940. Cappelli, E.: La "pallidareazione" di Gaetgen sul sieri lebbrosi; contributo allo studio dell'essenza della r. Wassermann, *Gior. di batteriol. e immunol.* 22: 425 (March) 1939.

15. Nagell, H.: Ueber das Vorkommen unspezifischer Hemmungen bei der Wassermannschen Reaktion, *Dermat. Wehnschr.* 90: 795 (June 4), 823 (June 21) 1930.

16. Heinemann, H.: Untersuchungen mit der Pallidareaktion, *Dermat. Wehnschr.* 94: 680 (May 14) 1932; Ueber die praktische Brauchbarkeit der Pallidareaktion im Arbeitskreis des Tropenarztes, *Arch. f. Schiffu. u. Tropen-Hyg.* 36: 9 (Jan.) 1932.

10. Kahn, R. L.: Facts Regarding the Quantitative Kahn Reaction, *Ven. Dis. Inform.* 20: 255 (Sept.) 1939.

11. Eagle, Harry; Hogan, R. B.; Mohr, C. F., and Black, S. H.: On the Reactivity of the Serum and Spinal Fluid of Leprous Patients with Spirochetal Suspensions, *Am. J. Syph., Gonorr. & Ven. Dis.*, to be published.

12. Moore, J. E.: Proceedings Assembly of Laboratory Directors and Serologists, *Ven. Dis. Inform.*, supp. 9, 1939, p. 59.

12. Carry out a prolonged serologic follow-up (weeks or months) by a good quantitative technic, testing the blood at frequent intervals without instituting anti-syphilitic treatment. As already emphasized, these tests must be performed in the same laboratory by the same technic. False positive tests tend spontaneously to fall in titer; those due to syphilis tend to remain unchanged or to rise. The length of time that may be necessary to arrive at a decision is exemplified by the cases reported in our two previous papers.⁴

13. Examine members of the family and sexual contacts. This step in the examination may be extremely important. The suspicion of congenital syphilis, for example, may be dismissed if father, mother and siblings prove to be nonsyphilitic. The suspicion of acquired syphilis, especially if thought to be recent, may often be lessened if not dismissed entirely by the discovery that a husband or wife, constantly and intimately exposed and almost certain to have been infected were the patient syphilitic, has remained normal.

14. Examine the cerebrospinal fluid if a decision cannot be reached earlier. When there are genuine reasons for believing that the positive result is false, do not adopt spinal puncture as the first step in the investigation, since often a clearcut exploration (e. g. of infectious mononucleosis) can be found for the supposed false positive result. Unless the reason for false positivity is obvious, however, the patient should not be dismissed without a study of the spinal fluid, lest asymptomatic neurosyphilis be missed, with subsequent perhaps tragic results.

15. The so-called provocative procedure (injection of an arsphenamine with following quantitative serologic testing daily for fourteen days) is in our opinion worthless. In another paper of this series¹⁷ we have cast doubt on the existence of the provocative phenomenon.

16. Finally, withhold antisyphilitic treatment unless and until the diagnosis of syphilis is proved. Such treatment is dangerous and should not be given unless the risk is justified by the actual existence of syphilis.

SUMMARY

From an outline of a method of approach to the differentiation of the biologic false positive serologic reaction from the positive result due to the presence of syphilitic infection, it is obvious that many of the suggested procedures require special clinical or laboratory expertness and that the final decision as to the presence or absence of syphilis in a given case is a highly individualized problem which often requires weeks or months of observation and expert syphilologic advice.

804 Medical Arts Building.

17. Eagle, Harry; Mohr, C. F., and Kemp, J. E.: The Value of the Provocative Serologic Test in Syphilis, to be published.

A Much Abused Term.—The term "scientific" in these modern days has come to be much abused. Many things that are popularly looked on as being scientific, and many persons who are said to look on life from a scientific point of view, are no more scientific than an infant in its cradle, however much the child is in process of being brought up on so-called scientific principles with a pediatricist on one side scientifically to measure its vitamins and calories day by day and a psychologist on the other scientifically to protect it from complexes—perhaps even to provide an infant chimpanzee as a comparative playmate. Thus does the quasi-Science of Medicine sometimes lead to absurdities from which medical practice, largely controlled by common sense, usually escapes.—Cushing, Harvey: *The Medical Career and Other Papers*, Boston, Little Brown & Co., 1940.

HYPOTHERMIA

SUBNORMAL TEMPERATURE AND ITS RELATION TO NEUROCIRCULATORY ASTHENIA (SOLDIER'S HEART)

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PHILADELPHIA

Over a period of several years, persons without obvious infection or organic disease whose average temperature was slightly but continuously higher than the usually accepted normal were selected for special study.¹ Of twenty persons studied, seventeen were women. Most of them had been suspected for months or years of having some obscure underlying infection or other disease to account for the "fever" and many had been needlessly subjected to prolonged expensive investigation or treatment to discover the cause. Because of the elevated temperature the condition was at first regarded as habitual hyperthermia, but it soon became evident that in most cases the "fever" was only one factor among many others which occur in certain so-called neurotic persons. Furthermore, most of the neurotic patients had signs and symptoms of syndromes commonly known as sympathicotonia or vagotonia, chiefly the former, or a combination of the two. It was also pointed out that average body temperature may vary among different normal persons just as does the pulse rate or blood pressure, and deviations from the accepted standard of the norm need not always be looked on as evidence of disease. Nevertheless a person whose average oral temperature is higher or lower than 37 C. (98.6 F.) and has the symptoms of a neurosis of whatever nature can hardly be regarded as normal. The calculated probable incidence of persons whose temperature consistently deviates from 37 C. (98.6 F.) is illustrated in chart 1.

As a matter of further interest a search was then made for persons whose average temperature is subnormal and falls under the left leg of the curve. Over a period of three years, hospital charts were continuously scrutinized for samples of temperature tracings which were consistently below the normal level. Patients with myxedema, Addison's disease, cachexia or shock or convalescent from infections or with chronic conditions known to cause or to be accompanied by hypothermia were excluded.

It was remarkable that the nine patients with hypothermia eventually selected for study were all men with predominant symptoms and signs of vagotonia. It may be recalled that, in studies of hyperthermia previously referred to,¹ most of the patients were women.

As the studies progressed it became more and more evident that the patients selected for observation had most, if not all, of the signs and symptoms characteristic of "neurocirculatory asthenia," variously called "soldier's heart," the "irritable heart of soldiers," "disturbed action of the heart" and "effort syndrome."² Had these cases been encountered during war time most of them no doubt would have been classed as such. Since neurocirculatory asthenia is a serious problem in all great wars, it is bound to be of immediate importance in this country as soon as the draft of men

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1. Reimann, H. A.: The Problem of Long Continued, Low Grade Fever, J. A. M. A. 107:1089-1093 (Oct. 3) 1936; Habitual Hyperthermia, Arch. Int. Med. 55:792-898 (May) 1935.
2. Lewis, Thomas: The Soldier's Heart and the Effort Syndrome, ed. 2, London, Shaw & Son, 1940.

for military service begins. It causes many difficulties in diagnosis and is one of the most frequent causes of invalidism among soldiers.

REPORT OF CASES OF HYPOTHERMIA

CASE 1.—A. F., a Jewish house painter aged 50, first came to the hospital in March 1936 complaining of pain in the left lower quadrant, loss of weight and general weakness for a year. He had had heartburn and constipation for years. His tonsils and all his teeth had been removed without relief of his symptoms. On physical examination no important abnormalities were discovered. Evidence of slight hypertrophic osteoarthritis of the spine was found on roentgenography. Laboratory studies of the blood and urine, including search for the presence of lead because of possible lead poisoning, gave negative results. A diagnosis of osteo-arthritis of the spine and sacro-iliac joints was made at that time.

The patient returned to the hospital a year later again complaining of backache, upper abdominal pain especially at night, anorexia and weakness. Certain powders given by his own physician often relieved the abdominal pain. Constipation was severe. Physical examination again showed nothing of diagnostic importance. Chemical studies for lead poisoning gave negative results. The blood, urine, gastric juice and bile were normal. The basal metabolic rate on two occasions was minus 17 and minus 25. Because the heart rate noted on the chart varied between 40 and 60 beats per minute, heart block was suspected but an electrocardiogram showed no abnormalities except bradycardia. No attention was paid to the temperature, which usually varied between 36.1 C. (97 F.) and 36.6 C. (98 F.) and did not reach 37 C. (98.6 F.) at any time. The blood pressure varied between 84 and 100 systolic and 55 and 70 diastolic.

Because of the low basal metabolic rate, thyroid substance was given first in 0.06 Gm. (1 grain) doses three times a day, later in 0.12 Gm. amounts and finally 0.54 Gm. (9 grains) a day for a period of two weeks. He complained of increased nervousness and dizziness and the drug was stopped. The basal metabolic rate rose to plus 12 during this treatment but fell to plus 2 a week later. There was no change in the symptoms, temperature level, pulse rate or blood pressure.

The patient tried to return to work but could not because of weakness. His wife said that the patient complained of symptoms only when his mind was unoccupied.

I became interested in the patient's temperature at this time and requested his return to the hospital for special studies. He now complained of insomnia, exhaustion and palpitation of the heart. This time the temperature as plotted never rose over 36.6 C. (98 F.), the pulse rate varied between 42 and 65 and the blood pressure between 80 and 100 systolic and 48 and 70 diastolic. The hospital chart is reproduced in chart 2. The subcutaneous injection of histamine hydrochloride 0.75 mg., atropine sulfate 1 mg., pilocarpine hydrochloride 1 mg. and of powdered opium 0.12 mg. orally on different occasions did not produce the abnormal effects said to occur in cases of vagotonia or sympathicotonia. Dryness of the mouth occurred after giving atropine, and a transient slight increase in pulse rate and blood pressure occurred with pilocarpine. Pressure on the eyeballs for two minutes caused no striking changes in blood pressure or heart rate. Jumping exercises caused the pulse rate to rise from 40 to 100 per minute but it returned to 40 after three minutes of rest. Amphetamine sulfate 20 mg. seemed to increase the pulse rate on two occasions from about 50 to 80 and once the blood pressure rose from 85 systolic, 50 diastolic to 110 systolic, 70 diastolic for eight hours. Amphetamine sulfate, in fact, when given daily in 10 mg. doses was the only medication which made the patient feel more energetic and active.

The patient was regarded as having a form of neurosis. He could be classed as a vagotonic type, in Eppinger and Hess's scheme, as far as the bradycardia and hypotension are concerned, but for the presence of constipation and normal response to drugs which supposedly stimulate the parasympathetic system. The low basal metabolic rates suggested hypothyroidism but treatment with thyroid substance failed to influence any

of the signs or laboratory manifestations except the basal metabolic rate and caused mild symptoms of hyperthyroidism.

Because of the nature of the patient's complaints, his psychiatric reactions, the hypothermia, bradycardia and hypotension, he was regarded as a type of person in whom such phenomena are characteristic. They have often been classified as having vagotonia or neurocirculatory asthenia.

CASE 2.—H. N., a Jewish machine operator aged 54, complained of dizziness, attacks of vomiting, weakness and anorexia for six or eight months. Ten years before he had had all his teeth extracted for joint pains, and eight years before a peptic ulcer was diagnosed. He recovered without treatment. Two months before, according to a roentgenologist, he was said to have had colitis, but no symptoms were present.

Physical examination revealed essentially normal conditions except that chronic catarrhal otitis was present. His temperature during eighteen days of observation varied from 36 C. (96.8 F.) to 36.6 C. (98 F.) and rose to "normal," or 37 C. (98.6 F.), only twice. The pulse rate varied between 55 and 74, averaging about 65. The blood pressure was quite constant at 90 systolic and 60 diastolic. It reached 120 and 70 on one

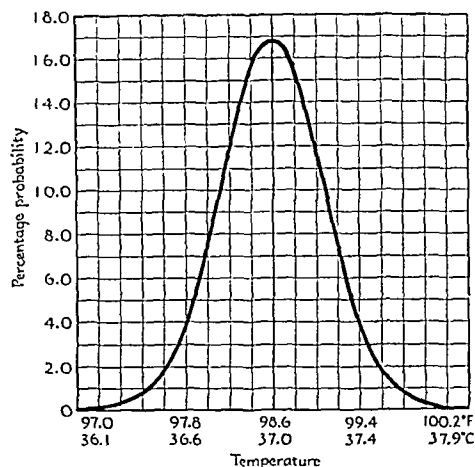


Chart 1.—Curve of the probable incidence of average normal oral temperature constructed from a table prepared by Dr. Frances Vanant.

occasion. An electrocardiogram and laboratory studies of the blood, urine and gastric contents gave negative results. The basal metabolic rate was minus 19.

The patient reacted normally to the injection of pilocarpine hydrochloride, epinephrine hydrochloride, ergotamine tartrate and physostigmine.

The patient's symptoms disappeared without therapy and he left the hospital seemingly improved.

Although a diagnosis of neurosis may not be justified in this case since chronic otitis was found, his past history, present symptoms and relief without special therapy strongly suggest it. The low basal metabolic rate was not regarded as pathognomonic of hypothyroidism but, as in case 1, was presumably part of general constitutional habitus together with hypothermia, hypotension and bradycardia.

CASE 3.—S. Y., an unemployed Jew aged 60, complained of backache for fifteen years and nausea and pains in the shoulder since losing his job two years before. No important abnormalities were found on examination, except absence of all teeth. Laboratory and roentgenographic studies gave negative results except for an electrocardiogram in which the PR interval registered 0.24 second. The extreme range of his temperature over a fourteen day period of study was 35.2 C. (95.6 F.) and 37.3 C. (99.2 F.), the usual range from 35.5 C. (96 F.) to 36.6 C. (98 F.). It seldom exceeded 36.6 C. (98 F.).

The pulse rate was quite constant at 74 but the blood pressure was irregular, varying from 86 to 125 systolic and 56 to 80 diastolic.

The psychiatrist, Dr. Keyes, regarded this patient as having an "unemployment" neurosis.

CASE 4.—W. S., a physician's son aged 19, was known to have occasional albuminuria which gave a good deal of concern to his family. There were no complaints except frequency of urination when exposed to cold. He was tall, thin and pale and was of the "asthenic" type. No physical abnormalities were detected. Test of the urine showed no albuminuria while the patient was recumbent but from one plus to three plus while erect, particularly after exercise. There were many cylindroids and a few hyaline casts in most samples. The condition was regarded as orthostatic or postural albuminuria. His blood pressure while resting ranged from 108 to 130 systolic and 50 to 65 diastolic. It was not elevated by the moderate exercise of jumping twenty times but rose rapidly to 280 systolic and 110 diastolic after five minutes of rapid stair climbing.

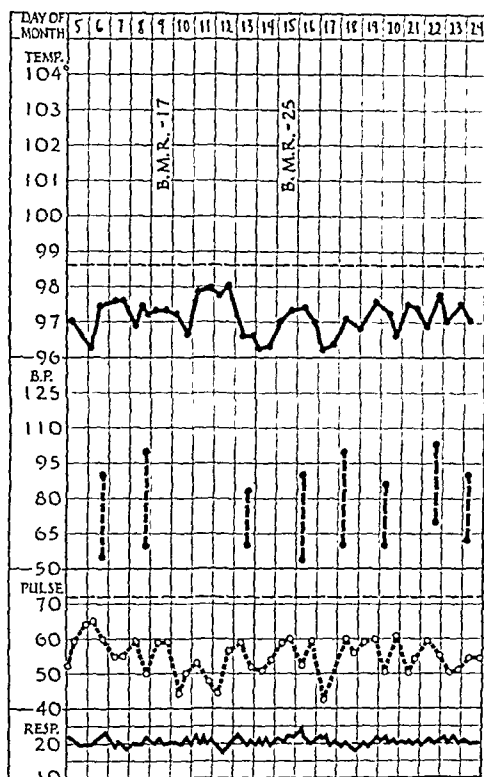


Chart 2.—Hospital course in case 1. Hypothermia, hypotension, bradycardia and low basal metabolic rate are noteworthy.

The pressure returned promptly to its usual level on rest. The pulse rate at rest varied from 54 to 72 beats per minute but increased rapidly during exercise. The temperature never rose above 36.9 C. (98.4 F.) during three days of observation. During the day it averaged 36.6 C. (98 F.) and at night 36 C. (97 F.). The lowest level recorded was 35.6 C. (96 F.).

In this case albuminuria attracted the attention and the hypothermia, hypotension and bradycardia would perhaps have been disregarded on casual study. The patient was of the asthenic, visceroptotic type with a labile and unstable vasomotor system.

Five other cases were studied which were similar and need not be described in detail. The ages ranged from 21 to 44 years and three of the patients were born in Europe. In four, gastrointestinal complaints, including dryness of the mouth, were predominant for months or years, and in one there were numerous bizarre complaints of chills, dizziness, choking sensations, dry throat, palpitation of the heart, bitter taste, headache, weakness and constipation, symptoms which

are typical of a neurosis. Cold sweaty hands and dermatographia were present. One patient had the dilated pupils and the tachycardia characteristic of sympathicotonia yet his temperature was usually subnormal. Only one of the five showed an unusually strong reaction to small doses of atropine and of pilocarpine with marked dryness and hypersecretion respectively, although the pulse rate and blood pressure were unaffected. The temperature of all five patients averaged below normal, usually with bradycardia and hypotension while at rest. Exercise or emotional excitement often caused an exaggerated increase in the pulse rate and blood pressure. According to the psychiatrist, four of the patients had psychoneurosis. Their basal metabolic rates varied from minus 11 to plus 5.

COMMENT

In contrast to previous studies¹ of twenty cases of hyperthermia which were found to occur chiefly in women with evidence of sympathicotonia, all nine patients with hypothermia included in this report were men, most of whom were classed as vagotonic. While this predominance of one sex or the other in the two conditions seems suggestive, too few cases have been observed to judge whether such a difference is the rule or not. Information on consistent differences in temperature of men and women is meager. Recently Hardy and Millhorat,³ in experiments on three women, found that the skin temperature of women was higher than that of men but only in a warm atmosphere. In a study among normal children,⁴ girls were found to have temperatures over 99 F. more often than boys. Rautmann,⁵ on the other hand, found the average temperature of a group of normal women a fraction of a degree lower than that of men.

It seemed that, in most patients studied, those whose average temperature was above normal usually gave evidence of sympathicotonia¹ while those with hypothermia were usually vagotonic, yet it is of interest to note that a given patient seldom had all the signs of either one syndrome or the other and more often had a mixture of the two. For example, several of the men with hypothermia gave the usual evidence of vagotonia with bradycardia and hypotension but complained of dry mouth and constipation and had dilated pupils, which are characteristic of sympathicotonia. One of them had tachycardia. At any rate the patients all showed evidence of nervous instability or imbalance. Evidence of slight imbalance may be found perhaps in the majority of otherwise normal persons in civil or military life. It is only when it becomes severe enough to cause noticeable disturbances that medical aid is sought. In certain persons accidents, injuries, psychic shock, infections or the physical and emotional strain during war or threatened war bring the symptoms to a clinical level. A list of the more important characteristics of vagotonia and sympathicotonia is given in the accompanying table.

While the existence of either hypothermia or hyperthermia alone may seem unimportant, their recognition together with other evidence of nervous imbalance, as reflected in various systems of the body, may give a clue to a correct diagnosis in certain puzzling cases. Much needless surgery or other unnecessary investiga-

3. Hardy, J. D., and Millhorat, A. T.: Basal Heat Loss and Production in Women at Temperatures from 23 to 36 C., *Proc. Soc. Exper. Biol. & Med.* 41: 94 (May) 1939.

4. Van der Bogert, Frank, and Moravec, C. L.: Body Temperature Variations in Apparently Healthy Children, *J. Pediat.* 10: 466-474 (April) 1937.

5. Rautmann, H.: Untersuchungen über der Variabilität der Körpertemperatur bei Gesunden, *Ztschr. f. Konstitutionslehre* 13: 588, 1928.

tion may thus be avoided and management guided along proper psychotherapeutic or physicaltherapeutic lines. As in most obscure diseases, undue attention has been given to foci of infection as a cause,² and many needless operations have been performed in the hope of relieving the symptoms. In this series of nine cases, the tonsils and some or all of the teeth had been removed in six, without beneficial effect. The symptoms in one case began immediately after tonsillectomy.

The majority of patients with hypothermia complained of gastrointestinal disturbances, various aches and pains throughout the body, dizziness, weakness and cardiac discomfort. Because of the variety of complaints, a variety of diagnoses was made in most cases, depending perhaps on the interest or specialty of the physician or succession of physicians consulted by the patient. For instance, in case 1, according to the opinion of different physicians, the occupation suggested lead poisoning, the complaints suggested arthritis and gastrointestinal disease; low blood pressure was considered as a cause of the disturbance, low basal metabolic rates suggested hypothyroidism, and bradycardia suggested heart block. Consequently numerous minor surgical operations, expensive laboratory investigation and many drugs were employed in diagnosis and treatment, most of which could probably have been avoided had less attention been focused on isolated signs and complaints and the syndrome recog-

Some Characteristics of Vagotonia and Sympathicotonia

Vagotonia	Sympathicotonia
"Wet" type with increased oral, nasal, bronchial, intestinal and other secretions	"Dry" type with decreased secretions
Low temperature	High temperature
Low basal metabolism	High basal metabolism
Low blood pressure	High blood pressure
Slow pulse rate	Fast pulse rate
Vasodilatation	Vasoconstriction
Increased peristalsis	Decreased peristalsis
Contracted pupil	Dilated pupil

nized as a whole. Patients of this type are commonly diagnosed as having colitis, chronic appendicitis and focal infection and are often turned into the class of the "much operated on" chronic invalid so well known to most practitioners.

Granting that the type of patient described here belongs to that group of persons who are subject to vasoneurotic disorders and come into especial prominence in wartime, it is questionable whether such names as "soldier's heart" or any other terms directing attention chiefly to the vascular system are desirable. The terms have come into current usage perhaps because of the more obvious symptoms and the ease with which the pulse rate can be counted, but it is certain that many other abnormalities can also be found if sought for. It is thought that all the signs and symptoms, as in the cases described in this paper, are evidence of a neuropathic disposition based on hereditary and constitutional inadequacy.²

SUMMARY

Nine patients were studied whose temperature level was consistently subnormal. Besides hypothermia they usually had other signs and symptoms of vagotonia such as hypotension, bradycardia, palpitation, sweating, low basal metabolic rates and numerous bizarre complaints for which no organic basis could be found. The symptoms and signs manifested by these men are the same as those described in the conditions known as neurocirculatory asthenia, effort syndrome or soldier's heart and probably arise from similar causes. Unless patients of this type are given a correct diagnosis they

may be subjected to much needless investigation and treatment and may be assigned to tasks beyond their limitations during military service. After possible organic causes for their disorder have been ruled out, treatment along psychotherapeutic and physical therapeutic lines is helpful.

EPIDEMIOLOGY OF TUBERCULOSIS

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In the long known nations, such as China, Egypt and Greece, consumption was described soon after man began to make permanent records. Where the disease originated we do not know, but its contagiousness was early suspected. As transportation developed, first through the use of beasts of burden and marching armies, then by sailboats, steamships, railroads, automobiles and finally airplanes, the disease was carried by persons in whom it was unsuspected and by persons who sought recovery of health from an ocean voyage or a change of climate.

For a long time there remained parts of the world where tuberculosis did not exist in man or animals. As it was carried to these places it spread among the natives, as it must have originally done in the long civilized countries. In some places it appeared in epidemic form, as manifested by illness of its victims. In all places it was in epidemic form but man did not have the refined methods of detecting its presence and it was therefore unsuspected in the majority of persons who had it and was recognized only in those whom it struck down. Not long ago the belief was held that tuberculosis was rare in the interior of Africa, but careful examination of 200,000 African boys employed in the gold mines revealed that 65 per cent had this disease in some phase of its development.

Of all the contagious diseases, tuberculosis has been the most difficult to control, partly because as it sweeps through a tribe, a family or a nation it does not leave a high percentage of immune persons, as does smallpox; on the contrary, it leaves the majority of those whom it attacks with living tubercle bacilli in their bodies, with serious future potentialities in many of them. It continues to strike these persons down, who if they had suffered from smallpox would be immune to that disease. The number of infected persons who fall ill each year is relatively small, but over a period of thirty or forty years the aggregate is large and is alarming to any nation that allows the disease to continue unmolested.

If tuberculosis is not opposed in a nation it will ultimately be present in some phase of its development in almost 100 per cent of the population. Among the animal herds, particularly cattle, if no control measures are used, it doubles itself every fifteen years.

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There was a time when it was thought that tubercularization of a nation of people was the only solution of the tuberculosis problem; that is, every one should be infected with tubercle bacilli. However, observation has revealed that in the nations where tubercularization is well nigh complete and where it has been in effect for centuries the morbidity and mortality from this disease are alarming. For example in China, where tuberculosis has existed for 5,000 years or more, one would expect a low incidence of clinical tuberculosis and a small death rate if tubercularization is the solution. In reality, in 1926-1927 Li reported that the mortality from tuberculosis in Peiping was 524 per hundred thousand and from 1927-1931 it was still 384, while from 1928 to 1932 in Shanghai the mortality rate was 244 and in Hong Kong 319. If these rates obtain throughout China with 400,000,000 or more people, approximately 1,200,000 lose their lives annually and if the Framingham, Mass., survey figures with reference to the number of living clinical cases per annual death are applied there now exist in China more than 10,000,000 persons with clinical tuberculosis, which Lee says is "a figure far exceeding the worst of any known epidemics in China."

In no nation where tuberculosis has been allowed to gain a foothold among the people or the domestic animals has it been known to die out; on the contrary, it spreads. Efforts of man have partially controlled it, as indicated by the reductions in morbidity, mortality and infection attack rates, but no nation has eradicated it. Witness the progress in controlling tuberculosis in some of the European nations before the World War and then observe how it spread like wildfire toward the end and immediately after the war in the same nations, largely because man's efforts against it were relaxed during the period of the war.

Another reason that tuberculosis has been so difficult to control is that it has always been so "kind to its hosts." The bacilli find lodgment in the tissues; they multiply and usually cause no unpleasantness until many of their progeny have been eliminated and have found habitations in the bodies of other persons. By the time the original host is aware of the presence of the disease through various symptoms, many of the patient's associates have already been infected and the lesion has made such inroads in the original case that an ultimate fatal issue is almost certain in a high percentage of persons. Therefore the healthiest appearing person in the community or the sleekest animal in the herd might be disseminating tubercle bacilli from lesions which had caused no incapacity.

The incubation period of tuberculosis ranges from three to seven weeks. At the end of this time mild symptoms may appear, such as elevation of temperature and slight malaise. There usually is no cough or expectoration, even when the lesions are located in the lung. The tissues are now found to be sensitized to the protein fraction of the tubercle bacillus, as manifested by a characteristic reaction when tuberculin or purified protein derivative is administered intracutaneously. The red cell sedimentation rate is increased. The symptoms when present are of slight duration and usually the individual is not seen by a physician. In the occasional person for whom a physician is consulted, the symptoms are often mistaken for a mild attack of influenza.

Thus the first manifestations of the disease are usually extremely mild and are unlike those often seen in such other contagious diseases as typhoid and scarlet fever.

With the latter group of diseases, following the first attack the infecting organisms usually die and the body is left with a reasonably good immunity against subsequent attacks. With tuberculosis, however, like syphilis, at the end of the first manifestations the organisms do not die but remain alive and virulent at some of their points of focalization, particularly in the regional lymph nodes. Moreover, the first attack of tuberculosis does not produce dependable immunity against either exogenous or endogenous reinfections.

The organisms in the lesions of the primary complex may remain there and never cause clinical lesions; again, they may spread from place to place through the lymphatic system, the blood stream and the bronchial tubes; they may gain access to the meninges through the rupture of a primary focus in the central nervous system and thus, at any time after the original infection occurs and the primary complex is established, new lesions may appear. If these lesions occur or develop in organs that have communications with the outside world, such as the intestinal, the urinary or the respiratory tract, tubercle bacilli are eliminated, after which they may gain entrance to the bodies of other persons, where they set up foci of disease. Probably the most common site, and certainly the most dangerous one from the standpoint of perpetuation of the disease, is the lung, since involvement of this organ often results in necrosis of sizable areas which find their way into the bronchial tree and are expectorated. Following this evacuation of the dead tissue, cavities remain, in and around which there may be marked proliferation of tubercle bacilli. Because of the communication with the outside world, many of these organisms are eliminated from the body daily. Thus the person who has such a condition has contagious tuberculosis; he may be ill or he may have no impairment whatever of working capacity. Yet wherever he goes and whenever he comes in contact with human beings or animals he may leave a trail of tuberculosis.

In the past, too many physicians have been satisfied to diagnose and treat tuberculosis only after it had reached the consumptive stage. Witness the sanatorium population of this country with from 80 to 90 per cent of patients in the consumptive stage on admission; witness the great volume of literature on treatment dealing largely with drastic procedures, such as extra-pleural thoracoplasty; then remember that all these patients at one time had only microscopic lesions, which could be detected solely by the tuberculin test.

Occasionally one hears the statement that the x-ray inspection of the chest is the best method of case finding in tuberculosis; whether one agrees with this statement will depend on one's interpretation of a case of tuberculosis. He who is satisfied to find tuberculosis only when it is entering on or is already in the consumptive stage will be satisfied with this statement, realizing of course the limitations of the x-ray inspection with reference to the small part of the body viewed in this manner and with man's inability to determine etiology from shadows. But he who appreciates the fact that tuberculosis begins in a microscopic way, when it can be detected only by the tuberculin test, and is cognizant of the fact that, even though the lesions are microscopic the individual has tuberculosis, will never be satisfied with anything less delicate than the tuberculin test in the finding of cases of tuberculosis.

It was not until a specific test for tuberculosis in its very beginning became available that man was able to

study truly its epidemiology. When Colonel Bushnell wrote a monograph on the Epidemiology of Tuberculosis twenty years ago he said "The role of the von Pirquet test in the epidemiology of tuberculosis is destined, it is believed, to become of increasing importance. Especial attention has therefore been paid to it in the hope that the Anglo-Saxon may be inspired by the example of the French and of the Germans to make use of it on a large scale—not only in the tropics, but also at home."

THE TUBERCULIN TEST

With our present methods of examination, and particularly with the tuberculin test, the trail which the contagious tuberculous person leaves can be picked up almost as the hound senses the trail of the fox or as the game animal is trailed in the snow.

The tuberculin test is our most valuable epidemiologic agent. When a good quality of tuberculin or purified protein derivative is carefully administered in the proper dosage by the intracutaneous method, it is almost uncanny with what accuracy it determines the presence of tubercle bacilli in the human or animal body. Even while the lesions are microscopic in size, the tuberculin test betrays their presence. Indeed, tubercle bacilli cannot escape detection by this test more than from three to seven weeks after they are lodged in the tissues of the human body. Thus the trail of tuberculosis may be picked up by the tuberculin test while it is fresh or at almost any subsequent time. In most parts of this country, reasonably fresh trails may be discovered through the examination of children in the preschool or school age. It is unusual for a child of any age to be in association with an adult who has contagious tuberculosis without becoming infected and reacting to tuberculin.

When the trail is detected the next step is to follow the child to the home and there administer the tuberculin test to every member of the household. The test is so specific that it rarely misses the patient with clinical tuberculosis except when the disease is so extensive and the patient so near death that the tissues are becoming desensitized through the large amount of tuberculo-protein being manufactured in the body. Usually in such persons the disease is readily detected by other means. All adult reactors in the household should have x-ray film inspections of their chests. Such an inspection with a single film enables one to visualize reasonably well about 75 per cent of the lung. If lesions are present which have become macroscopic and are located in that part of the lung visualized, they will usually cast shadows on the x-ray film. However, these are only shadows and several diseases cast shadows which cannot be differentiated one from the other; therefore the x-ray film inspection is only a screening process; that is, it selects those members of the household who have disease in the lungs which may be tuberculous.

If one or more members are found to have such shadows, the sputum should be studied immediately for acid-fast bacilli. The presence of such bacilli does not constitute a diagnosis; there are several organisms which morphologically cannot be differentiated from the tubercle bacillus. Their staining qualities are identical. Before they were discovered or well understood, laboratorians made diagnoses of tuberculosis on finding acid-fast bacilli in such material as sputum, gastric contents and urine. This is no longer done by the well informed laboratory worker nor does the physician take the laboratory report indicating the pres-

ence of acid-fast bacilli without further study. When these are present their pathogenicity must be determined. This is best done by guinea pig inoculation. The old procedure of introducing suspected material into the body of the guinea pig and waiting six weeks for developments is obsolete. Too much time is consumed, during which the person who actually has tuberculosis may spread tubercle bacilli to his associates. A method that requires only two weeks or slightly more consists in inoculating animals which do not react to tuberculin. If pathogenic organisms are in the material inoculated, the animal will react to the tuberculin test in about two weeks.

Another method consists in injecting guinea pigs intracutaneously with suspected material. Within seven to twenty-one days a nodule appears at the site of the injection, from which smears may be made and examined for the presence of acid-fast bacilli. As soon as the inguinal lymph nodes have enlarged on the side of the inoculation, the animal may be killed and the node studied for tubercle bacilli to confirm the earlier observation. Woolsey has found that the average time for a diagnosis in this manner is twenty days.

Pickoff injects silica suspension subcutaneously in the flank of the guinea pig and immediately he injects into the same area material suspected of containing tubercle bacilli. The presence of silica apparently stimulates the proliferation of tubercle bacilli and they multiply so rapidly that in some cases within ten to fifteen days material aspirated from this area contains tubercle bacilli in abundance.

Thus, within a brief period after we pick up the trail through the tuberculin reaction of a child we have found the source and have determined the pathogenicity of the organism. This, however, has not been done by slipshod single test methods. It would be most gratifying if any single phase of the examination, such as the x-ray film, would enable us to determine etiology quickly. With the present state of affairs, however, we are rarely able to establish diagnoses on the basis of one phase of the examination. Abrams at one time enjoyed an excellent reputation as an internist but he set himself up as a dictator in diagnosis from a single sample of blood only to fail, as all others must fail who make diagnoses without sufficient evidence.

Failing to find a contagious case of tuberculosis in the immediate household, including the parents, servants and all others who reside there, one should next look to the close relatives, such as the grandparents, aunts and uncles, who frequently are in contact with the child. Since tuberculosis in contagious form often exists in elderly persons, the examination of grandparents may uncover the unsuspected source of infection in the child. In a number of surveys from 1 to 2 per cent of school teachers have been found to have clinical pulmonary tuberculosis. Therefore if the source of the child's infection is not located elsewhere his teachers and other members of the school personnel with whom he has been in contact should be examined. Failing here, the neighbors and close friends of the family may be considered. In following the trail, one may learn that a close associate of the child has died of tuberculosis. With this information the search should not cease, for there may be other cases among the living associates.

Some children become infected with tubercle bacilli through casual contact. Under proper conditions only a minute is required for infection from a contagious case of tuberculosis. Thus at a public meeting place, in a public conveyance, during a brief visit to or from

a distant relative, infection may occur. One picks up the trail through the tuberculin test but it is impossible to follow it. This may be likened to trailing the game bird in the snow or the sand to the point where it takes flight for tens or hundreds of miles.

Another possibility which must never be overlooked is that tuberculosis may exist among the animal associates of the child. The dog, the cat and even the parrot may be eliminating tubercle bacilli which result in infection of the child. In the past, large numbers of children became reactors to tuberculin from bovine tubercle bacilli and even today much of the primary and even clinical tuberculosis in the people of countries that have not controlled tuberculosis among the cattle is due to the bovine type of tubercle bacillus. Therefore in the epidemiologic study one should never overlook the necessary examination of animals who are in contact with the child or whose products the child consumes.

This epidemiologic procedure is not applicable in places where a high percentage of children are infected, indicating the presence of numerous clinical cases of tuberculosis in the community. The trails, as indicated by the tuberculin test, are so numerous, cross one another so frequently and are so superimposed on one another that they may be likened to the trails in the snow of game animals which are abundant. Here they may actually form paths which cross one another in various ways and it is unusual to find a single trail which one can follow to the animal. Where tuberculosis is so prevalent, the only effective procedure is to examine all the adults to find the contagious cases. When these are isolated or treated, an environment is provided in which only a few of the children of the next generation will react to tuberculin. Then the ideal method of trailing tuberculosis with the tuberculin test can be employed. Fortunately, in the greater part of the United States the disease is not so prevalent but that this method is already an effective procedure.

At the Lymanhurst Health Center we operate epidemiologic clinics both for adults and for children. A few persons register in these clinics with symptoms which have caused tuberculosis to be suspected but for the most part the patients are requested to be examined because (1) an adult associate has been found to have contagious tuberculosis or (2) one or more children in a family have been found to react to tuberculin. The examination of the adults consists first of the administration of the tuberculin test. If there is no reaction to a milligram of tuberculin and there is absence of suggestive symptoms, no further phase of the examination is done. Those who react to tuberculin have x-ray film inspections of their chests immediately and, if shadows are found, other phases of the examination, including the laboratory, clinical and even bronchoscopic studies, are made. The whole thought of the examination of such persons is to screen out those who at the moment have tuberculosis which is approaching or is already in the contagious stage in order that they may be treated or isolated. The tuberculin reactors whose chests are clear on all phases of the examination are reexamined annually, as it is well understood that clinical lesions may make their appearance at any time subsequent to the first examination.

The following citations are actual cases and show how effectively tuberculosis can be trailed by administering the tuberculin test among children:

In February 1930 a school girl aged 8 years was found to react to tuberculin. Both her mother and her father were then found to react to the test and x-ray film inspection revealed

evidence of disease in the lungs of both. Further examination proved that the father's disease was tuberculous but in the minimal stage, while the mother's disease was tuberculous but in the far advanced stage. Tubercle bacilli were present in her sputum. This family was earning its livelihood by making and selling pies from house to house. Both the father and the mother were admitted to a sanatorium. The father died there in two months of coronary occlusion. The mother died in April 1939 of pneumonia and pulmonary tuberculosis. Thus the disease in this family was permitted to perpetuate itself and no attempts had been made to stop it until it was found in a school child by the tuberculin test.

A boy aged 12 years was found to react to tuberculin in 1931. The family refused examination until 1934, when the father was found to have advanced pulmonary tuberculosis with tubercle bacilli in the sputum. He was immediately admitted to a sanatorium in April 1934 and died there in December of the same year. A sister was also found to have minimal pulmonary tuberculosis in 1934 and was admitted to a sanatorium. She was discharged in 1937 but was readmitted in 1939 with far advanced disease. One brother and two sisters of this boy and the mother were examined in 1934, all of whom were found to have the first infection type of tuberculosis. Another brother had only an x-ray inspection of his chest, which revealed no evidence of disease. Unfortunately the tuberculin test was not administered and therefore we do not know whether he had the first infection type of tuberculosis.

This family emphasizes the importance of making a provision whereby the private physician and the health officer can promptly follow the trail of tuberculosis rather than have to resort to persuasion, which may require months and even years and may never be successful. The health officer must be permitted to seek out the contagious foci of tubercle bacilli regardless of whose body is concealing them. These foci may be likened to dangerous criminals, for they kill by an insidious method just as surely as the criminals kill by an immediate method. As long as the Federal Bureau of Investigation could not follow certain criminals into any part of the United States but must give up pursuit at state lines, it was difficult to apprehend them. Now that the pursuit can be carried into any part of the nation, the criminal rarely escapes. It even became necessary to prosecute those who concealed criminals knowingly or unknowingly. In some cases this may become necessary for those who conceal contagious tuberculous lesions after educational measures have failed. Indeed, already measures are being provided and enforced to compel the incorrigible person with contagious tuberculosis to be isolated as long as the disease is contagious. In some places special buildings are being contemplated for such persons, where they can be kept under lock and key. This is absolutely essential for every state where incorrigible tuberculous persons exist.

We did not hesitate to isolate "Typhoid Mary" for the last twenty-three years of her life because she left a trail of typhoid wherever she associated with other persons. From the standpoint of contagion, tuberculosis does not differ from typhoid.

We have traced the disease to grandparents and other relatives, to domestics, to teachers and to neighbors of children who reacted to the tuberculin test. In fact, in one group of twenty-five who had only the first infection type of tuberculosis a total of fifty-six contacts were examined, among whom thirty-two were found to have the reinfection type of tuberculosis and the remaining twenty-four had the first infection type of the disease.

In recent years tuberculin has been used extensively to test students on admission to schools of nursing and

medicine. The trail may be followed to the source of some of the reactors. Those who do not react have the test repeated periodically as long as they are non-reactors. While in school, many become reactors; when one takes up this trail, as pioneers in the field, as particularly Diehl and Boynton have done, it usually leads to a tuberculous patient whom the student has examined, nursed or treated. Thus a potent source of infection among hospital personnel was trailed down by the tuberculin test and a great international movement is under way to overcome it.

There is nothing in the entire field of epidemiologic medicine more fascinating than picking up the trail of tuberculosis by the tuberculin test and following to its headquarters in the body of a man or woman. As the criminal leaves traces which lead to his identity and capture, so does tuberculosis leave traces which lead to its discovery. Here one makes a capture of inestimable value to the victim and his associates. In cities and states where tuberculosis is no longer universal among the citizens, all tuberculin reactors (particularly children and young adults) should be reported by physicians to the health department. The modern health officer is interested in epidemiology and because of the nature of his position and trained personnel at his disposal he can take up the trail with the private physician more gracefully and effectively than anyone else in the community.

OTHER METHODS

Since the ideal epidemiologic procedure as described has recently been developed, it has not been in use sufficiently long to bear its best fruit in large volume. Therefore we are compelled still to use old methods which are far less satisfactory but yet are of great value. One of these methods consists in beginning with the infant who has mild or severe manifestations of disease which are called to the attention of the physician before the tuberculin test is administered but complete examination proves that tuberculosis is present. For example:

An infant aged approximately 13 months was found to have the first infection type of tuberculosis in the pneumonic stage. The symptoms were mild but sufficient to call a physician. This child had few adult contacts. The mother and father were found to react to tuberculin but no clinical lesions could be located. One uncle, who had been in contact with the child, reacted to tuberculin but no clinical lesions were detected. A grandmother with whom the infant had lived for a short time and who had fondled him on many occasions resisted the idea of examination because she considered it impossible for any one over 40 years of age to have tuberculosis. However, she had been known to complain of fatigue, dyspnea, anorexia and loss of weight. In about one month after the infant's condition was detected, the grandmother permitted the administration of a tuberculin test, which resulted in a reaction. Following this she made numerous excuses and the x-ray inspection of her chest was delayed for approximately two months. This revealed evidence of disease but another month was lost before she could "remember" to collect a specimen of sputum for examination. This was found to be teeming with pathogenic acid-fast bacilli.

An infant aged 6 months with serious illness was admitted to one of our hospitals in April 1934. His disease proved to be generalized miliary tuberculosis, which was fatal in a short time. Examination of the adult contacts disclosed that the mother had tuberculous lesions in the left lung, and tubercle bacilli were recovered from her sputum.

On June 16, 1935, an apparently healthy infant was born in a small hospital. The nurse in charge of the obstetric and pediatric service gave him the necessary care the first two days of life. He remained in good health until he was 6 weeks old, when he began to cough and had fever. At the age of 8 weeks he died of generalized miliary tuberculosis. An examination of all his adult contacts revealed no case of clinical

tuberculosis except the nurse who cared for him for only two days. She was found to have extensive disease with an abundance of pathogenic acid-fast bacilli in her sputum. The case was tried in the courts and the hospital was required to pay \$1,500 to the family of the infant. The verdict of the jury was upheld by the state supreme court.

Usually the child with tuberculous meningitis or generalized miliary disease is not contagious; therefore it is purely a matter of seeking the source in order to isolate or treat so as to prevent others from becoming infected.

Another epidemiologic procedure consists in beginning with adults who are found to have contagious tuberculosis. Such persons may be found because of (1) declining general health, (2) recent sudden developments such as excruciating pain in the chest or hemorrhage, (3) suspicion of the disease by neighbors or relatives, (4) detection of lesions previously unsuspected during a survey, (5) lesions discovered accidentally while examination is being made for other reasons, such as subsequent to an accident or for life insurance.

This procedure really amounts to back trailing; that is, we examine the persons with whom the recently discovered patient has been in contact and where cultures of tubercle bacilli may have been established. Here one finds the disease in various stages of its development, depending somewhat on the interval of time that has elapsed since the contact which each person had with the patient. The majority of definite contacts will be found to have the first infection type of tuberculosis, as manifested by the tuberculin test. On first examination a few of the adult reactors, perhaps 1 per cent or less, will have evidence of clinical lesions in their lungs or elsewhere; some may already have the disease in the contagious stage. They may or may not have had any significant symptoms. The remainder of the tuberculin reactors will have no evidence of clinical disease that can be detected in the living body by any phase of the examination. Nevertheless each of them has potential clinical tuberculosis and therefore should be adequately examined at least once a year. Among them there may occasionally appear such acute conditions as tuberculous meningitis, generalized miliary disease, tuberculous pneumonia and pleurisy with effusion. These may develop almost over night and the physician can never foresee their coming nor is there anything he can do to prevent them. They constitute a situation that at present is inevitable and unavoidable among persons infected with tubercle bacilli. The more usual development, however, is the chronic form of tuberculosis, which may appear in one or more parts of the body. We watch for it in the lungs not only because we have better methods of examining them than other internal organs but also because it is so likely to become contagious. It rarely occurs during the period of childhood; therefore our observations among reactors can be limited almost entirely to adults. The fact that there is no evidence of clinical disease revealed in the chest of tuberculin reactors today is no guaranty that it will not be present at any subsequent time. Indeed, there is no time limit; that is, one cannot say that after a period of five years there is no need for further examinations of tuberculin reactors; they must be continued as long as the individual reacts to tuberculin.

On Jan. 23, 1934, a girl aged 19 years reported to her physician because of illness. He found evidence of advanced pulmonary tuberculosis in the left lung, which was in the contagious stage. In back trailing, the tuberculin test revealed the presence of the first infection type of tuberculosis in the

bodies of each of her three sisters. The x-ray films of the chests of two of the sisters aged 17 and 18 years revealed no evidence of disease. However, one year later each of them had unmistakable pulmonary tuberculosis of the reinfection type, which was detected in the presymptom and the precontagious stage.

In the four years 1936-1939, 466 tuberculosis suspects were reported to the Minneapolis Health Department through complaints of relatives or neighbors. Examination of these suspected persons revealed 114 previously unknown cases of the reinfection clinical type of tuberculosis.

In 1934 we reported seventeen tuberculous patients representing the same number of families. They were picked at random and there was a total of 102 persons in these seventeen families. Investigation revealed that forty-two had the reinfection clinical type of tuberculosis, which had already reached the symptom stage:

From the time their illness began until June 15, 1933, the total illness amounted to 1,836 months, or 153 years. Out of the forty-two with the reinfection type of disease twenty-nine were sent to sanatoriums and until June 15, 1933, they had spent 674 months, or more than fifty-six years, mostly in tax-supported institutions. The very conservative cost in our tax-supported institutions is \$84 a month per patient. Thus, taxation has already paid more than \$56,000 for twenty-nine members of seventeen families who were hospitalized. This leaves 1,162 months, or approximately ninety-seven years, of illness spent in homes. Twelve of the forty-two patients with the reinfection type of tuberculosis have already died. In addition to the cases of the reinfection type of disease there were thirty-one cases of the first infection type. Two of the 102 members of the seventeen families refused examination. Thus, of 100 examined, seventy-three were contaminated with tubercle bacilli. In addition there was one case of tuberculosis of the bones and joints. Inasmuch as the thirty-one who are apparently well but have the first infection type of disease are potential reinfection types, it is obvious that since most of them are children some will later fall ill of the reinfection type. While the number of cases, the total duration of illness, total hospitalization and the number of deaths are great, they are insignificant when compared with the dissemination of tubercle bacilli by the forty-two reinfection types of cases to their associates. The thirty-one in their own families doubtless represent a very small percentage of the total number they have infected. Thus, they have started all over again the vicious cycle of tuberculosis and the next generation will reap much of the harvest.

Thus, epidemiologic work carefully practiced is capable of bringing to light numerous cases of tuberculosis in its various phases of development. For example, in the Minneapolis Health Department in 1936, 916 cases of first infection type of tuberculosis (83 per cent of all such cases reported that year) were brought to light through the work of the epidemiologists. The same year, 162 persons with reinfection clinical types of tuberculosis (21 per cent of all such cases reported that year) were detected as a result of epidemiologic studies. In 1937, 59 per cent of the first infection type and 29 per cent of all reinfections or clinical types of tuberculosis cases reported to the health department were due to the epidemiologic work. In 1938 this was true in 52 per cent of first infection and 24 per cent of reinfection, while in 1939 it was 64 per cent of first infections and 30 per cent of reinfection clinical cases. Thus, approximately two thirds of all the cases of the first infection type of tuberculosis and one fourth of all with clinical tuberculosis were brought to light through the efforts of the epidemiologists. If the time arrives when no obstruction is offered to the activities of the epidemiologist, all cases of tuberculosis will be detected promptly, regardless of the phase of its development.

However, this accomplishment is dependent on the medical profession of the United States, whose members must make all the necessary examinations, decide on the final diagnoses, administer treatment and provide medical care for all who are isolated because of contagious disease.

IMPORTANCE OF ROENTGENOGRAPHING OUR ARMED FORCES

Since the close of the World War, the government has paid out about a thousand million dollars in compensation to veterans for tuberculosis, exclusive of hospitalization costs.

Hospitalization in the twelve veterans tuberculosis sanatoriums cost \$6,400,000 for the year 1939. Multiplying that by 22 gives the tidy sum of \$140,800,000.

The admissions to veterans hospitals for tuberculosis in 1938 numbered 19,989, and there were seventy-two more cases of tuberculosis in the government hospitals in 1938 than there were in 1937. The load is still increasing, twenty-two years after the armistice.

There were 1,979 deaths from tuberculosis in 1938, which was 19.56 per cent of the deaths from all causes.

From 1928 to 1932, a five year period, 28,497 Veterans Administration patients died in all hospitals from all causes. Of these 12,113, or 41 per cent, died of tuberculosis of all types.

Between 1924 and 1932, 61,330 veterans occupied hospital beds maintained by the government on account of tuberculosis. Two and one-fourth army divisions occupied beds because of tuberculosis.

THE DIAGNOSIS OF TUBERCULOSIS

ESPECIALLY OF PULMONARY TUBERCULOSIS

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The diagnosis of tuberculosis, and especially of pulmonary tuberculosis, is one of the most important problems the physician has to deal with. He should endeavor to find out not only the presence or absence of tuberculosis but, if present, whether it is active, because if active it needs treatment. It should be studied in a systematic way and, if necessary, no method should be omitted to attain a successful result. A careful and thorough history should always be taken. Sometimes from the history alone one will obtain an important lead. The history should be the first method of procedure and, in the taking of it, one should try to obtain the approximate date and manner of onset. Certain pertinent questions should be asked of the patient. For instance, he should be asked whether he has ever had a recent or past pleurisy, either dry or with effusion. He should also be asked whether he has ever had definite spitting of blood from the lungs, either recent or in the past; also with regard to a prolonged cough or prolonged bronchitis, either at present or in the past; also with regard to irritability, weakness, chills and fever, loss of weight, flushing of the face and a localized wheeze in the chest, particularly at the apex of the lung. The family history and present and previous occupations are important, and one can sometimes obtain from them a history of contact. A history

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of contact is of great value, especially with medical students and nurses who are on service in the tuberculosis wards of hospitals; also with those members of families who have been exposed to cases of open tuberculosis. These are only some of the outstanding things to look for in taking a history.

X-RAY EXAMINATION

The examination by x-rays is the most important means at our disposal to diagnose lung tuberculosis and particularly active lung tuberculosis. If possible stereoscopic films should always be made. When the physician is in doubt as to whether he is dealing with tuberculosis or whether the tuberculosis is merely latent and therefore not demanding treatment, or whether it is active, he should get the advice of a competent x-ray man. It should not usually be difficult for the competent x-ray specialist to diagnose lung tuberculosis and to tell whether it is merely latent or active. His knowledge of the character and location of the shadows in the lungs often makes it an easy matter for him to diagnose an active lung phthisis.

One should not wait for the development of clinical pulmonary tuberculosis before attempting to diagnose it but should try to discover which individuals have definite evidence of disease in the lungs. An attempt should then be made to direct the lives of these persons so that the disease, not discovered by physical signs but by the x-ray films, may not progress. Brown and Sampson¹ state that, if by the age of 25 there are no parenchymatous changes in the lung suggestive of pulmonary phthisis, only in rare instances, and then usually only when subjected to repeated and continuous infection, will the individual develop pulmonary tuberculosis. As physical examination usually fails to detect early lesions in these young persons, these authors suggest that no child should leave school, and particularly high school, without an x-ray examination of the chest. This x-ray examination would probably reveal most of those persons who during the second, third and fourth decades of life are liable to break down with clinical pulmonary tuberculosis. These authors made an x-ray study of all the school children of Saranac Lake over a period of seven years, numbering more than 4,000. Of these 4,000 children seventy-nine, less than 2 per cent, showed a parenchymal lesion by x-ray examination and were given a physical examination. Only seven had definite physical signs.

For years it was commonly accepted that the usual site of beginning pulmonary tuberculosis was at the very top of the lung. The reason for this was that slight changes in breathing (roughened breathing, prolonged expiration) and possibly a slight increase in the vocal resonance, together with some more or less change in percussion, occurred at the apex in some patients who later developed a fatal pulmonary tuberculosis. X-ray examination, however, showed that the usual site of beginning clinical lung tuberculosis was in the upper lobe below the clavicle and that these slight changes were due to lesions—in some cases deep seated, in others healed—or to no definitely determined pathologic changes.

Brown and Sampson reported their observations on 280 patients with minimal pulmonary tuberculosis. This group includes all those with the slightest but still sufficient evidence on which to base a diagnosis of beginning pulmonary phthisis. Some years ago the staff at

Trudeau Sanatorium concluded that moderately coarse moist rales at an apex were the only reliable data obtained on physical examination. In these 280 patients moderately coarse moist rales were present in 27 per cent, while a definite parenchymatous x-ray lesion was found in more than 99 per cent. Hemoptysis was as frequent as rales (26 per cent), while pleuritic effusion occurred in 12 per cent. Tubercle bacilli in the sputum were found in 35 per cent. It is thus seen that in this group of 280 patients with minimal lung tuberculosis 277 had definite x-ray evidence of pulmonary phthisis and only seventy-six presented definite evidence by physical signs. This is striking evidence of the superiority of the x-ray over the physical examination in the diagnosis of lung tuberculosis.

In another study to compare the relative values of physical signs and x-ray observations, also reported by Sampson and Brown,¹ 1,004 consecutive patients were examined in Trudeau Sanatorium. All patients with definite physical signs had also x-ray evidence of disease. In nineteen (1.89 per cent) the physical signs gave a greater extent of the disease than the x-ray. In 211 (21.01 per cent) the extent of disease was the same by the two methods. In 361 patients (35.95 per cent) the x-ray examination showed more disease than physical signs. In 396 patients (39.44 per cent) the x-ray examination showed definite lung tuberculosis, and the physical signs were practically normal. In this group of 1,004 patients a cavity was present by x-ray examination in 392 persons (39.04 per cent) while fifty-eight patients had evidence of a cavity by physical signs (5.77 per cent). Here also the x-ray examination was much more accurate.

In a study which Sampson and Brown made on 1,367 patients diagnosed as having pulmonary tuberculosis, a comparison of the physical and x-ray examinations showed that while 68.5 per cent of them had rales at an apex more than 99 per cent had definite x-ray changes. In this group of 1,367 patients tubercle bacilli occurred in 61.5 per cent, hemoptysis in 33.5 per cent and pleural effusion in 12 per cent.

There are still those who are skeptical of the great value of the x-rays to diagnose lung tuberculosis. To meet this skepticism the late Lawrason Brown studied 503 patients at Trudeau Sanatorium whose lungs gave only indefinite or no physical signs. X-ray examination of these showed pulmonary tuberculosis, and sooner or later more than 84 per cent presented clearcut clinical signs of disease.

Let us now look at the other side of the picture, that is, what happened to those patients whose x-ray films showed no evidence of a parenchymatous change interpreted as tuberculous. Several studies were made by Drs. Lawrason Brown and Fred H. Heise at Trudeau Sanatorium to determine this. In 264 patients in whom none of the five cardinal diagnostic criteria were present, followed after one to seven years, only two developed lung tuberculosis. At the time of examination one of these had tuberculous cervical adenitis and the other had a carious rib. Another study of 2,600 consecutive patients showed 298 with negative x-ray examinations, and of these 298 patients only two developed tuberculosis and died of the disease.²

Another study was made on 312 patients who had no definite x-ray evidence of tuberculosis, but each patient had one or more of the other four cardinal

1. Sampson, Homer L., and Brown, Lawrason: Correlation of Clinical and Roentgenological Observations in Pulmonary Tuberculosis, *Radiology* 22: 1-14 (Jan.) 1934.

2. The five cardinal diagnostic criteria are tubercle bacilli, moderately coarse moist rales above the third rib and third dorsal spine, a parenchymatous x-ray lesion in the same area, hemoptysis, and pleurisy with effusion.

diagnostic criteria. Fifty-nine were said to have had tubercle bacilli in the sputum at some time, often before admission to Trudeau Sanatorium; eighty-one patients had rales at the apex, sixty-eight rales at the base, seventy-six hemoptysis and twenty-eight pleural effusion. Of these 312 patients only two died, one of whom had been reported as having had tubercle bacilli in the sputum, the other as having had hemoptysis.

In a study at Trudeau Sanatorium of 1,000 patients, Heise and Brown found that rales lose in diagnostic significance as they occur in isolated areas from the upper third of the lung downward. Moderately coarse moist rales in the upper third of the lung are associated with a positive x-ray examination in 98 per cent and fine moist rales in the same location in 80 per cent. In 20 per cent of the patients in this group with positive x-ray examinations, no rales were heard.

The evidence of a parenchymal lesion in those cases in which tubercle bacilli were present in the sputum was 99.2 per cent, rales in the apex 99.3 per cent, hemoptysis 96 per cent and pleurisy with effusion 98.5 per cent.

While the evidence submitted emphatically points to the x-ray examination of the lungs as being by far the best means to diagnose pulmonary tuberculosis, a thorough physical examination of the chest should never be omitted. All physicians should try to become experts in physical examination and particularly in the interpretation of rales, because there are occasions when it is not possible to obtain an x-ray examination; moreover, one often sees faulty films and faulty interpretation. These two methods, x-ray, and physical examination, should always be employed.

CAVITATION

The presence of cavitation in the lung is of great assistance in diagnosing pulmonary tuberculosis. Cavitation is not confined solely to lung tuberculosis, as there are other diseases that can produce it; for instance, cancer of the lung, mycotic infections and certain forms of silicosis. It is, however, more frequent in pulmonary tuberculosis than in any other disease. For many years patients with cavities detected by physical examination were not admitted to Trudeau Sanatorium. Now, however, over 40 per cent of the patients have cavities when studied by x-ray examination. In a series of 392 consecutive patients with cavities, as shown by x-ray examination, in only 15 per cent were there any physical signs even suggestive of cavitation. In a more recent study of 500 patients with cavities the classic physical signs of cavitation were present in only 5 per cent.³ The detection of cavities by physical examination depends on the size and location of the cavity and the increased density of the lung between the cavity and the chest wall. If the bronchus draining the cavity is closed by secretion or by twisting or stenosis, the cavity may be silent. There are also suggestive signs of cavitation, such as bronchovesicular breathing, harsh inspiration with coarse moist rales over a limited area below the second rib. Coarse moist rales alone in the upper third of the lung are always suggestive of cavitation. Its presence, however, can be determined with certainty only by an x-ray examination. When the trachea is drawn markedly to one side, signs of cavitation frequently occur in the inner first interspace. This error can best be avoided by x-ray examination.

Within the past two or three years the diagnosis or detection of pulmonary cavities has occasionally been made easier by the procedure spoken of as "planigraphy" or "tomography." This is a method of taking specific layers of tissue, which, as stated, sometimes reveals the cavities more clearly than they are revealed by the usual methods, more particularly single films.

The value of this procedure, however, is still controversial. Suffice it to say that it is worth using when doubt exists; in fact, at times it reveals apparently cavity formation where it has not been suspected. The method, however, has inherent defects or would have to be used only in conjunction with specific films.

The vast majority of all pulmonary cavities are "silent" and some are not visible. Many cavities develop when the patient is improving symptomatically and such cavities may remain silent for months.

EARLY X-RAY EVIDENCES OF PULMONARY TUBERCULOSIS

What are the early x-ray evidences of pulmonary tuberculosis?

Do changes on the x-ray film of the lung precede those detected by the usual physical examination? Some physicians still believe that a careful physical examination is superior or at least equal to an x-ray examination of the chest. Both methods should always be part of a thorough routine examination. Even if the physician is expert in physical examination and even if both methods are at his disposal, I place the x-ray examination as by far the more important one. It is the sense of sight against the sense of hearing. No patient has been completely examined until there has also been made an x-ray film of his chest, always in stereo if possible. Thus an examination of the chest should now consist of inspection, palpation, percussion, auscultation and x-ray examination. In order not to be biased by the x-ray examination it is advisable to make the physical examination first and then to read the x-ray films. In answer to the question as stated, one can say that in a large number of cases definite changes characteristic of tuberculosis occur in an x-ray film long before definite evidence of abnormal physical signs can be detected.

Changes on films of the lungs in reference to tuberculosis may be stated as negative, doubtful, suggestive or characteristic but not as pathognomonic. While all the data that can be obtained from the x-ray film, such as age, sex, location and character of the shadow, should be considered in diagnosis, yet I am always suspicious of moderately coarse and fine mottling, irregularly distributed in any portion of the lung. By mottling I mean a spotted appearance. Tuberculosis can produce changes other than such mottling which are often impossible to distinguish from those due to other conditions. When such mottling, however, occurs in the upper third of the chest, I regard it as characteristic of tuberculosis, which must always be kept in mind until disproved, even though physical signs are normal. Of 1,367 consecutive cases at Trudeau Sanatorium (a sanatorium solely for pulmonary tuberculosis) 32 per cent had either no abnormal physical signs or such slight ones that the diagnosis was made entirely or in large part from the x-ray film.⁴ Of 1,004 cases in private practice in Saranac Lake 148, or 15 per cent, of such cases occurred.

3. The classic physical signs indicative of cavity include tympanic or cracked pot note, markedly increased vocal resonance (intense bronchophony, pectoriloquy), amphoric or bronchial breathing and coarse, consonating, metallic, bubbling rales.

4. Sampson, Homer L., and Brown, Lawrason: The Value of the Roentgenologic Examination in Pulmonary Tuberculosis, *Am. J. Roentgenol.* 25: 209-219 (Feb.) 1931.

Another important question is How early in the course of tuberculosis of the lungs can definite changes be detected? The earliest changes in pulmonary tuberculosis may escape observation on account of their location or of their slight density. An absence of change is unusual, for in less than 1 per cent are parenchymatous changes lacking when tubercle bacilli occur in the sputum. In the last 500 patients in Trudeau Sanatorium (ending September 1930) parenchymatous changes were always seen in the x-ray film when tubercle bacilli were present in the sputum.

The relation of the time a patient has an x-ray examination of the chest with regard to the time of onset of the disease varies greatly. In most cases the discovery of abnormal physical signs causes the film of the chest to be taken. In a constantly increasing number of instances routine physical examinations are supplemented by x-ray films. Homer L. Sampson and the late Dr. Lawrason Brown were strongly of the view that any patient who presents only peritruncal or no changes by x-ray examination at the age of 25 has slight chances of developing active pulmonary tuberculosis later in life. The routine examination of large numbers of school children led them to believe that definite x-ray evidence of pulmonary tuberculosis may exist for years before symptoms arise sufficient to focus attention to the lungs and that symptoms often precede the appearance of abnormal physical signs.

These observers (Sampson and Brown) attempted to determine how soon tubercles appear on the films of rabbits with a miliary tuberculosis and saw definite tubercles on the films thirteen days after inoculation. When the lungs were removed from the thorax and inflated to the normal size, the tubercles stood out clearly. In most instances the first manifestations that are seen in the lung films after puberty are accompanied by considerable collateral inflammation because the individual is more or less allergic. The deposit in the lungs of a few scattered tubercle bacilli may lead to scattered mottling of slight extent. If many tubercle bacilli are deposited, miliary pulmonary tuberculosis may develop. A condition between these extremes is the usual thing. This may lead to infiltration, mottling in the upper third of the lung or to a more intense exudative focus in the same area, the so-called subclavicular infiltration. This type of infiltration is diagnosed only from the film and the sputum. Occasionally tuberculous lesions are discovered on the film where a week or ten days previously they did not exist. Sampson and Brown report one instance in which a focus manifested itself within forty-eight hours. Such exudative lesions would be more commonly discovered if films were taken more frequently and at shorter intervals.

Since it is fairly well established that small areas of disease can be shown on good stereograms, it is necessary to attempt to standardize the impressions as to the character of the shadows seen in pulmonary tuberculosis. Certain important points, however, should be remembered. First, that a final diagnosis should not be made until all data are assembled or until sufficient evidence is available. Second, that disease in the lung is characterized by differences in densities on the film or screen, and the most important change is that of tissue density.

One cannot say that there are pathognomonic shadows of pulmonary tuberculosis, because other pulmonary diseases produce shadows that are similar. However, one constantly hears such expressions as "This looks

like tuberculosis," referring to a mottling confined to the upper half of the lung field, or "That is a neoplasm," referring to the heavy shadows in the root or mediastinal regions. Though one cannot say that tuberculosis or any other pulmonary disease has pathognomonic shadows, one can make certain differentiations which are reliable. The interpretation of films will always remain a matter of personal equation or judgment, and a final diagnosis will continue to be empirical; that is to say, founded on experience. The final diagnosis should be made only after the data are assembled. When one person is accustomed in a large tuberculosis sanatorium to read from thirty to forty films a day, is able to correlate all other facts connected with each film and is able to follow the films throughout the patient's stay in the sanatorium, he gains a wonderful knowledge of chest films. There will, however, always be a few films in which all signs fail. Mottling, when found above the hilus of the lung, will be found to be due to tuberculosis more often than otherwise. When the mottling is associated with circumscribed areas of rarefaction or annular shadows, or with stringlike shadows of fibrosis, the diagnosis of pulmonary tuberculosis is further strengthened. The same shadow complexes found elsewhere in the lung, with the apexes free, lessen the probability of tuberculosis. Yet characteristic mottling at the base is often due to tuberculosis.

The five cardinal diagnostic data of tuberculosis in 1,367 cases diagnosed pulmonary tuberculosis from 1,478 consecutive cases in Trudeau Sanatorium were tubercle bacilli 61.5 per cent, rales 68.5 per cent, x-ray examination 99 per cent, hemoptysis 33.5 per cent and pleurisy 12 per cent. It is thus seen that the x-ray examination is by far the best means available with which to diagnose pulmonary tuberculosis. The physical examination of the chest comes second and the laboratory examination third in importance. The importance of the x-ray examination does not cease when the diagnosis of pulmonary tuberculosis is made. It now takes on a new role: that of recording the changes that may take place in the existing foci or in the development of new areas of disease. The x-ray film now enters the field of treatment or prognosis. Frequent films should now be made, always in stereo, never at intervals greater than two months and usually in from four to six weeks.

The serial x-ray film is the most reliable method of following the course of the disease, and a progressing lesion is frequently seen a considerable time before symptoms appear. Symptoms or an increase of symptoms due to a relapse of pulmonary tuberculosis may precede by several weeks changes in physical signs. At Trudeau Sanatorium 40 per cent or more of all patients admitted have cavities as shown by x-ray examination. It is important in treatment to detect the development of cavities, and this is done almost entirely on the evidence of the x-ray film. The detection also of small and even large cavities is often determined only by the film. We frequently see patients in whom the physical examination gives no suspicion of cavitation and yet the x-ray film shows well defined and sometimes large cavitation.

THE DETERMINATION OF CLINICAL ACTIVITY IN PULMONARY TUBERCULOSIS BY X-RAY EXAMINATION

Ornstein and Sampson⁵ attempted to interpret x-ray observations in lung tuberculosis not only with regard

5. Ornstein, George G., and Sampson, Homer L.: The Determination of Clinical Activity in Pulmonary Tuberculosis from Roentgenograms, *Am. Rev. Tuberc.* 5: 842 (Dec.) 1921.

to the extent of the disease but also as to whether the character of the lesion might be associated with the symptom complex observed. Activity in pulmonary tuberculosis is usually limited to the symptoms and physical signs of the patient. Attempts to determine activity by complement fixation, tuberculin, auto-urine inoculation, chemical urine reactions and sputum analysis have been unsatisfactory. Many physicians base clinical activity on temperature and pulse. For instance, the case is called active when the pulse and temperature for more than three of seven consecutive days is above a rate of 90 for the pulse and 99 F. for a male, and above a rate of 96 for the pulse and 99.6 F. for a female.

Interpretation of shadows in x-ray films should be associated with the underlying pathologic process. Tubercles may occur in various stages—from early formation in which the tubercles are not walled off to the later stages in which they are fibrous and calcified (walled off tubercles). Shadows cast by tubercles vary almost directly in proportion to their density. Shadows cast by new tubercles are nebulous in character, that is, cloudy, hazy or misty, and their margins appear to shade into the adjoining parenchyma. A more opaque appearance with sharper margins of the shadows occurs with the fibrous and calcified tubercles.

Pulmonary changes produced by advance or retrogression, and by final healing of pulmonary tuberculosis, produce certain shadows on the x-ray film which may be differentiated. Pathologically active tuberculosis differs from the healed tubercle or the resulting scar tissue. In the active case one sees an entirely different picture from that seen in the healed case. In the former one usually sees a combination of various shadow manifestations. Let us examine a small field in the active process. I assume that there is no scar tissue or calcification in this small area. Here one sees mottling, i. e. spots or blotches, with ill defined margins, or a "cotton ball" appearance, blending gradually with the surrounding lung tissue, which appears hazy and cloudy. When this picture is seen on the x-ray film, one can be reasonably sure that both pathologic and clinical activity are occurring.

Let us assume that this cottony appearance indicates activity. As the disease retrogresses the lung tissue surrounding the cotton ball appears to become better aerated and at the same time one realizes that the cotton ball is smaller and more compact. Or one may see the "cotton balls" (usually the small ones) almost fade from view, leaving a more or less finely dotted appearance or little stringlike shadows. As the patient continues to do well, the mottling loses still more of its collateral haziness; the "cotton balls" become more compact and their appearance more discrete, and the rays pass through areas that were previously hazy. The picture is that of a better aerated lung. Usually further retrogressive changes occur in this group, and the case becomes clinically inactive.

There is another group of patients in which the films show a preponderance of stringlike or wiry shadows, or dense discrete mottling. In this group further retrogressive change is hardly possible, and these cases can be looked on as probably healed tuberculosis.

From this x-ray evidence of these pathologic changes, unless there is occurrence of new tubercle formation demonstrable on the film, even in the presence of extensive disease, one may conclude that, at the time of the reading, clinical activity is absent.

The following is a brief summary of their work:

1. Activity is indicated in the x-ray film by (1) mottling with decidedly ill defined margins, blending gradually with the surrounding lung tissue, which appears hazy and cloudy (non-walled off tubercles) and (2) the presence of spontaneous and localized pneumothoraces.
2. The amount of activity is dependent on the area of surface drained by the circulation (coalesced or disseminated tubercles).
3. Diminished activity runs parallel to the amount of fibrosis and calcification that has taken place.

One sometimes sees an increase in the physical signs with a very definite improvement in the clinical condition of the patient. This should make one question the reliability of increasing physical signs as evidence of an advance of the disease. This problem can be solved by an x-ray film. A comparison of physical signs and the x-ray film will frequently show that in such conditions there is frequently a decrease of the lung shadows; that is, a decrease of the pathologic process. Sometimes the physical signs may remain the same while the x-ray evidence of disease may show a definite increase. There are also cases in which the x-ray examination shows definite tuberculous infiltration of an apex with tubercle bacilli in sputum but the physical examination does not elicit rales. Later on rales may develop at the apex but the x-ray film may show marked clearing.

When one examines a single set of stereo x-ray films one has a difficult task in trying to determine activity. Here the personal equation enters largely. A fair estimate may usually be made after practice with good rapidly exposed stereoscopic films. Certain shadows with ill defined borders suggest activity, while those with clearcut borders indicate an inactive condition. Sampson and Brown¹ attempted to correlate these interpretations with what happened to 1,024 consecutive patients during their residence in Trudeau Sanatorium. From the x-ray film, 424 cases were classified as active, 40.5 per cent. Of these 424 cases 63.3 per cent showed progression of disease in subsequent x-ray films or artificial pneumothorax was given. No attempt was made to determine activity from the physical signs, but 294 (30 per cent) were regarded symptomatically as active, and of these 52 per cent later showed a definite advance of the disease. Of 125 cases in which a relapse later occurred, 88 per cent had been diagnosed as active by x-ray examination, 45 per cent from symptoms.

EXTENT OF THE LESION

The x-ray examination can usually be relied on to show the extent of the tuberculous disease and it frequently reveals more disease than can be elicited by physical examination. In many cases it also reveals foci which would otherwise be overlooked. Sometimes the reverse occurs: physical signs are heard where no disease is seen on the films. The latter condition often happens as disease goes to arrest. The x-ray shadows may then disappear from below up toward the apex but rales persist over these areas. In other instances in which physical signs are more extensive than x-ray evidence, one must be sure that one is not also dealing with a mixed infection in the lung due to an associated bronchiectasis or drainage into the lung from a chronic sinus condition. One can thus say that this occurs more often with nontuberculous than with tuberculous conditions.

When one has determined that tuberculous disease is present in a lung, one must then state the extent of the disease and from physical signs and symptoms classify

the extent into stages or groups. There are a first, second and third stage.

For many years symptoms and physical signs were alone used as a basis for these divisions. When the x-rays came to be used so much more in diagnosing chest conditions they finally supplanted physical signs and symptoms. It is now advisable to classify entirely on the extent and intensity of the disease as revealed by the x-ray examination. One can now speak of lung conditions as nontuberculous, suspicious, minimal, moderately advanced and far advanced. Thus to describe the extent of the disease we now use x-ray interpretation in place of physical examination.

EVOLUTION OF THE DISEASE

The stereoscopic film is the most reliable means by which to observe progression or retrogression of pulmonary tuberculosis. I believe also that it is a reasonably reliable method to determine the activity of a process. However, in any specific case one cannot be absolutely certain with regard to the presence of activity; disagreement exists with regard to the value of the x-ray examination over this matter. Some believe that the disease can progress or retrogress and that these changes need not necessarily be seen in the film. In a series of cases which Sampson and Brown studied they found that the stereoscopic films gave valuable information with regard to the status of the disease, and that they often gave evidence of activity which otherwise was not suspected. In this respect one must remember several factors. First, in extensive disease where many shadows are present, small though definite changes may occur and pass unrecognized. Second, it is quite common to observe increases in the film interpreted (1) as new disease or (2) as reactivation of previously existing foci when there is no increase of symptoms to correspond to this finding. These new areas or increases in the previously existing shadows usually have characteristic borders. As a rule they are ill defined and the extreme margins do not usually have any hint at demarcation. As most shadows grow older they usually become denser in the control field and the margins become clearcut and show abrupt differences in density as compared with the surrounding lung field. Older shadows appear less confluent, like tapioca drying out. This determination is easy with serial roentgenograms and a revolving stereoscope, with which it is possible to compare minute and corresponding areas on the serial films. It is another matter to do this from a single set of films, and yet with practice it can be done with a fair degree of accuracy. As proof of this Sampson and Brown made a study of 373 cases at Trudeau Sanatorium to compare the relative value of the presence of activity on admission by clinical means and by x-ray examination. The results were evaluated by comparing the course of the disease while in the institution. Clinical activity was based on a study of the patient during the first week in the sanatorium and x-ray activity on stereoscopic films also taken during the first week:

When the disease was "clinically inactive," 37 per cent showed no change, 17 per cent showed an increase.

When the disease by x-ray examination was inactive, 48 per cent showed no change and 6 per cent showed an increase.

When the disease was "clinically active" 15 per cent showed no change and 53 per cent grew worse.

When the disease by x-ray examination was active, 3 per cent showed no change and 62 per cent grew worse.

These differences are strikingly in favor of x-ray interpretation of activity; and the better the films and the more perfect the stereoscopic effect, the easier it is to pick out such changes. Low grade films or ones of an indifferent character with any blur are of little value for comparison, and it is difficult to arrest motion on films exposed more than from one fifteenth to one twentieth of a second.

The "end result shadows" are as a rule due to the organization of the foci. With serial x-ray films taken over a considerable period of time a great deal of information is obtained with regard to the evolution of these shadows, and different groups can be interpreted as older or more recent than others. The final decision, however, as to progression or retrogression or to activity or inactivity of a focus should not be drawn only from the x-ray films, although it is sometimes necessary to do this when films are the only means at our disposal to make this decision.

X-RAY DIAGNOSIS IN INFANTS AND CHILDREN

The systematic x-ray examination of infants and children is exceedingly important. No field of study offers more opportunity for satisfactory results than does the use of the x-ray film to detect pulmonary tuberculosis in the infant and child. By the film alone a diagnosis is often possible, when otherwise complete ignorance of disease would exist. The x-ray film is the most essential factor in the examination of the child's chest, and without it pulmonary disease, particularly pulmonary tuberculosis, would remain for a long time not recognized. Most pediatricians base the diagnosis of pulmonary tuberculosis almost entirely on the evidence of the film and the result of the tuberculin skin test.

Large numbers of children have been roentgenographed. Such studies have developed along different lines. Some roentgenograph only children who give a positive tuberculin test. Others roentgenograph only those who are more than 10 per cent under weight. Still others include those who are known to have been exposed to the disease and who would probably have an infection. In my opinion not only these three groups but all children should have an x-ray examination at least once a year. This last plan has been successfully carried out in Saranac Lake. As the result of the efforts of the late Dr. Lawrason Brown, all the school children in Saranac Lake have an x-ray film taken at least once a year. No discrimination is made, and all children are examined by x-rays because early in his work Lawrason Brown found that certain children, apparently above suspicion, proved to have a pulmonary disease. In connection with this x-ray examination note is made of the past and present symptoms the child may have had, family exposure, or any other points that might have a bearing on the diagnosis of a pulmonary disease. A physical examination of the lungs is made when there are any suspicious shadows on the film.

A result of this systematic examination was the finding of abnormal lung shadows in apparently normal children. On subsequent examination, some of the films showed complete clearing of these abnormalities. It would have been a mistake to say that these shadows indicated pulmonary tuberculosis. In a few instances, however, intrapulmonary nodules developed in these areas and these strongly suggested a tuberculous focus.

A few cases of clinical tuberculosis were revealed, and these few cases justified the method. The finding

of the aforementioned suspicious shadows most certainly protected these children from stresses that might have had serious results. There are instances recorded in which children who had abnormal shadows disobeyed instructions, and at a later date advanced tuberculosis was found.

X-RAY DIFFERENTIAL DIAGNOSIS IN PULMONARY TUBERCULOSIS

An analysis of x-ray films lies in one's ability to understand the reasons for normal or abnormal shadows seen in the film or plate. One should therefore become acquainted with films of the theoretically normal parts. In the lungs these theoretically normal parts may vary within wide limits.

When one roentgenographs the inflated lungs of a guinea pig or a rabbit after removal from the chest, and if the vascular system retains its blood, one obtains a film of a pair of lungs not unlike that of the human lung, i. e. two fields traversed by many linear markings radiating from two central points. This arborization is the result of shadows cast by the pulmonary system; viz., vascular, bronchial and lymph. The vascular system makes up most of these shadows. The bronchial "tree" is also important but as a rule is difficult to identify. The lymph channels go unrecognized as such.

These "trees" or linear markings start from a root and proceed toward the periphery of the lung in a more or less uninterrupted manner until the periphery is almost reached. They become more delicate as a result of their diminishing size and resemble the silhouette of a young leafless sapling. Any gross interference with this linear appearance would suggest anatomic abnormality or a pathologic change in the lung.

In the theoretically normal lung one sees a few densities at the root, possibly in the lung field; also a few shadows of a similar character, only usually smaller, or a localized increase in some of the linear markings. The question then arises How numerous can these densities or the stage of exaggeration of the linear markings become before one can regard them as evidence of past or present lung disease? No definite line can be drawn. Sampson,⁶ however, presents some ideas for consideration. He divides roentgenograms into the following groups: first the theoretically normal, second the doubtful and third the positive.

He mentions the positive group reservedly, since diagnosis does not begin and end with the x-ray film but should be made on all clinical evidence even though the film may be the deciding factor.

Normal Lung.—Here one would expect to find an x-ray film free of any abnormal densities. This rarely exists, yet one may call this "normal" when having one or a few abnormal densities at the root with possibly an occasional density in the parenchymal field.

Doubtful Group.—This group embraces films in which one sees one or more of the following: more numerous densities, the shadows at the root more pronounced, a general haze in a portion of the lung field, tenting or peaking of the diaphragm, a secondary shadow in the extreme apex of the lung immediately under the second rib posteriorly, spoken of as a pleural cap, and also a slight localized or general accentuation of the lung markings.

Positive Group.—This includes anything in excess of the two preceding groups, namely coalescing of the iso-

lated densities, blotchy shadows, fans, mottling, speckling, gross exaggeration of the linear markings and heavy homogeneous densities. Several other descriptive terms are also used and have the same meaning. Sampson offers the following terms of standardization: (1) exaggeration of lung markings, doubtful or definite; (2) stringlike shadows; (3) mottling, fine or coarse; (4) areas of rarefaction and annular shadows; (5) homogeneous densities, localized or general, light marked.

In this positive group it is more a matter of the nature of the pathologic change than the presence of a pathologic condition.

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THE TREATMENT OF PULMONARY TUBERCULOSIS

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No specific drug, vaccine or serum has been found as a positive cure for pulmonary tuberculosis. Favorable results have been reported following the use of gold sodium thiosulfate. We ourselves confirmed the results of Henrichsen and Sweany¹ that approximately 50 per cent of cases of advanced tuberculosis with a stationary or progressive trend are favorably influenced. The discussions at the International Conference in The Hague in 1932 were highly favorable. However, one must admit that the only real noteworthy advance that has been made in the treatment of this disease is the utilization of collapse therapy, which has furnished abundant convincing evidence of its value in the pathologic lesions of pulmonary tuberculosis.

EXPECTANT TREATMENT

To the time-honored triad of general rest, fresh air and wholesome food, modern treatment has added collapse therapy to secure local rest to the diseased lung. The therapeutic result will be in proportion to the degree, duration and timeliness of general plus local rest; the sooner the treatment is instituted the more rapid and certain will be the resolution. This is true not only in the early but also in the advanced cases and in cases in which the disease is resistant and demands some form of surgical aid.

COLLAPSE THERAPY

The therapeutic importance of collapse and compression of the tuberculous lung through operative procedures is fully recognized and remains the most significant advancement toward the healing of this disease. Cavity closure by induced collapse or compression should be instituted earlier than it often is. The time allotted to a hopeful but futile course of sanatorium routine too frequently results in extension of disease to the opposite lung, larynx or elsewhere in the body and may render the patient incurable or at least unsuitable for collapse therapy.

The various operative procedures for controlling the different stages of pulmonary tuberculosis all have definite indications and limitations, and there is no procedure yet devised which is universally applicable

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1. Henrichsen, K. J., and Sweany, H. C.: Sanocrysin Treatment in Tuberculosis, *Am. Rev. Tuberc. (supp.)* 28:1-45 (Oct.) 1933.

6. Sampson, Homer L.: X-Ray Differential Diagnosis in Pulmonary Tuberculosis, *Bull. New York Tuberc.* 4:1 and 8, 1923.

to all the changing phases of the disease. Every procedure must be graded to control the local lesion and utilized as necessary to avert the need of more extensive surgery. To realize the ultimate benefits of pulmonary collapse it must be combined with proper medical management rather than considered sufficient in itself, since collapse of the lung merely creates conditions that are favorable to healing. No attempt will be made to discuss fully the many procedures of this form of therapy, space being inadequate, but I will summarize those having gained acceptance and known to be of established value.

ARTIFICIAL PNEUMOTHORAX

The first and simplest procedure to be considered in a collapse therapy program is artificial pneumothorax. Induced pneumothorax is the nucleus of surgical methods to secure added rest to the diseased area of the lung. Other procedures follow successively as required, replacing early relaxation and temporary collapse by a firm, irrevocable compression. Its value is restricted to about 40 per cent of cases because adhesions either prevent any introduction of gas or allow insufficient amounts to produce a satisfactory collapse of the lung. Pneumothorax therapy should be instituted in cases of pulmonary tuberculosis with beginning infiltration as well as in moderately advanced cases if, after from one to three months' trial of sanatorium treatment, there is no improvement in the patient's condition. About 50 per cent of patients can be rehabilitated by artificial pneumothorax, the remaining ones demanding more radical methods of collapse.

Common distressing practices in pneumothorax therapy are that artificial pneumothorax is not utilized early enough or that it is continued too long in many instances wherein it is obvious that adhesions are preventing adequate collapse of the lung. Another undesirable practice is that of inducing high degrees of positive pressure in order to stretch offending adhesions; advantageous as it may seem, this practice is neither wise nor safe and frequently causes complications.

Hemoptysis, whether slight or severe, is an obligatory indication to establish an artificial pneumothorax at once, provided it is possible to determine from which lung the blood is emanating. Tuberculous spontaneous pneumothorax should be converted into a controlled artificial pneumothorax. Tuberculous pleurisy with effusion should be treated by aspiration and replacement of the fluid by controlled amounts of air, and an artificial pneumothorax maintained, with regular refills, over a period of time commensurate with the indications of the underlying disease.

Chronic fibrocaseous types of tuberculosis, without demonstrable cavity formation and with essential freedom from disease in the contralateral lung, yield the best results. In progressive fibrocaseous cavernous types with lesions more destructive in character, the end results are not so favorable. In active, advancing caseous pneumonic and caseous bronchopneumonic types of tuberculosis, regardless of incompatible opinions, excellent results are seen if a satisfactory collapse of the lung can be established.

In unilateral cavity cases a pneumothorax should be established immediately. In this way there is less danger of extension to the gastrointestinal tract, to the larynx and to the same and opposite lung. In bilateral lesions of a similar type it may be induced on the two sides, preferably alternately rather than simultaneously.

Renal and cardiac failure, or extensive emphysema, are absolute contraindications. Tuberculosis of the larynx and intestine is a contraindication if far advanced and interfering with the patient's nutrition, since all forms of treatment are unavailing in these cases. Controlled diabetes is no contraindication, nor is active disease of the opposite lung unless it is extensive or rapidly advancing.

Contralateral lung lesions are of much less importance than the type of disease on the side to be collapsed, and the adequacy of the pneumothorax. Less than 2 per cent of our patients died of complications directly or indirectly related to the artificial pneumothorax, such as gas embolism (two cases), empyema or spontaneous pneumothorax.

The length of time that a pneumothorax should be maintained is largely determined by the underlying pathologic condition. In early cases without demonstrable cavity formation, from two to three years is probably the optimal period; in those with small or medium sized cavities, from three to five years, and in cases in which there are large cavities the collapse should be maintained for at least five years. In the latter cases one frequently feels that the only safe course is to maintain the pneumothorax for an indefinite period, possibly for life.

OLEOTHORAX

Oleothonax² finds practical application in the treatment of tuberculous pyothorax. It may also be used as a substitute for pneumothorax in cases in which, because of an obliterating pneumothorax, premature loss of collapse is threatened. For this purpose 1 per cent of a preparation of cajuput in liquid petrolatum is commonly used. Because the oil is absorbed less rapidly than air it is usually possible to prevent additional reexpansion and avoid air refills by its use.

INTRAPLEURAL PNEUMONOLYSIS

Pleuritic adhesions which prevent a satisfactory collapse of the lung are appropriate for surgical cutting in about 20 per cent of the cases in which artificial pneumothorax has been established. Under such conditions closed intrapleural pneumonolysis is the procedure of choice whenever the adhesions are of an operable type; thus an inefficient pneumothorax is converted into an efficient one. Closed intrapleural pneumonolysis consists in the severance of restraining pleuritic adhesions under thoracoscopic guidance by means of the high frequency current or galvanocautery. Since I developed the electrosurgical method, in contradistinction to the galvanocautery method of Jacobaeus³ we have found it possible to effect closure of cavities in approximately 70 per cent of more than 450 cases in which operation was performed. The defects of the galvanocautery are wholly lacking in the high frequency method, as unbelievably large adhesions can be severed in this manner with little discomfort to the patient and only slight subsequent reaction.

The radiographic appearance of adhesions is very unreliable—only by thoracoscopic examination can one determine their character, number and extent. These factors, plus their relationship to the lung, pericardium, nerve trunks and large blood vessels, will determine their operability.

2. Matson, Ray W.: Oleothorax, in Goldberg, Benjamin: *Clinical Tuberculosis*, Philadelphia, F. A. Davis Company, 1939.

3. Jacobaeus, H. C.: The Cauterization of Adhesions in Artificial Pneumothorax Treatment of Pulmonary Tuberculosis, *Am. Rev. Tuberc.* 6: 871-897 (Dec.) 1922.

In our series of more than 500 cases of phrenic neurectomy, 15 per cent—including patients with cavernous tuberculosis who were candidates for major surgery—recovered as a result of the phrenic operation.

EXTRAPLEURAL THORACOPLASTY

Present day technic makes extrapleural thoracoplasty a truly selective and lung conserving measure and also permits its use in combination with other collapse procedures on the opposite side. Thoracoplasty should always be considered when other collapse procedures have failed to control the disease or close cavities. The determination to resort to this type of surgery should not be postponed until the patient is too poor a surgical risk to warrant its trial. A much more comprehensive preoperative study is required of cases selected for thoracoplasty than for artificial pneumothorax. Thoracoplasty is indicated when the disease is predominantly unilateral and of a productive or fibroid type, with or without cavity formation. The patient should be preferably under 50 years of age and his general condition should be fairly good.

The contraindications to thoracoplasty, in addition to those which obtain for pneumothorax, include poor surgical risks, extensive bilateral involvement and coexistent incurable organic disease.

In this operation the number and lengths of ribs to be resected depend on the type of disease and the patient's general condition. I always prefer to do the posterior operation in at least two stages, beginning with resection of portions of the upper five ribs first or complete resection of the upper three ribs and part of the fourth rib. Resection of portions of the lower ribs then follows within the course of the next week or ten days. In cases of large upper lobe cavities, an upper posterior phase operation, with resection of the upper five ribs, is carried out—followed within the course of a week by resection of the remaining portions of the upper three or four ribs close to the sternum. If it is necessary, the posterior lower phase operation is carried out as soon as possible.

In lower lobe tuberculosis the lower phase operation is carried out first. In poor surgical risk cases, in which only a graded thoracoplasty is permissible, sections of two or three ribs are removed at a time; other operations follow within the course of a week or ten days. A partial thoracoplasty, whether unilateral or bilateral, may be considered in certain carefully selected cases, when the lesion is apical or subapical, with essential freedom from disease below the third or fourth rib posteriorly. Patients presenting large cavities and who have a pneumothorax offer many difficulties of closure. In most instances it is much better to abandon the pneumothorax and carry out the thoracoplasty after the lung has reexpanded. In bilateral apical involvement a bilateral partial thoracoplasty or other combination of procedures may be considered.

Results—The greatly improved and well group, in a series of over 400 cases, comprises approximately 60 per cent of the series. The direct operative mortality has been less than 2 per cent. I attribute a large proportion of the uncomplicated results to careful selection of cases and their preoperative and postoperative care, and especially to persistence in placing the patient in an oxygen tent for hyperventilation (one half out of every three hours during the twenty-four hours preceding and for forty-eight hours following operation).

EXTRAFASCIAL APICOLYSIS

Extrascapular apicolysis is indicated in the case of apical and subapical cavities with dense fibrotic pericavity zones without exudative foci. For closure of primary or resistant apical cavities Semb⁸ proposes extrascapular apicolysis combined with an upper phase thoracoplasty. The technic consists of resection of the entire first, second, third and part of the fourth ribs, including portions of the transverse process, with or without exarticulation of the ribs posteriorly, and resection anteriorly close to the sternum. The lung is then freed over the diseased area by careful blunt dissection in the endothoracic fascia, which includes severance of the connective tissue bundles overlying the apex of the lung. A portion of lung containing the cavity is detached in this way to allow contraction from the periphery toward the hilus, simulating that obtained by artificial pneumothorax. Complete collapse of cavities is claimed by Semb in 90 per cent of his cases. Eighty per cent were rendered sputum free, and his mortality was less than 5 per cent if the resection did not exceed six ribs at one stage. Gale and Midelfart⁹ have improved this procedure with laudable changes. They report sixty-five cases with five deaths (6.6 per cent) and forty-eight cases (73.5 per cent) with perfect cavity closure.

I myself feel that the popularity of this operation is diminishing, as it requires considerably more time technically than other surgical collapse procedures, and only good risk cases should be subjected to it. As for results, there is a question in my mind whether they are better than in the next procedure.

EXTRAPLEURAL PNEUMOTHORAX

The outcome of extrapleural pneumothorax has been described approvingly in numerous reports. It consists in removal of a section of the third or fourth rib posteriorly, then separation of the parietal pleura from the endothoracic fascia and the establishment of an extrapleural space sufficiently large to close the cavity in the lung. The wound is closed without drainage. Air refills are carried out within the course of the next twenty-four hours, as in artificial pneumothorax, being controlled by the fluoroscope. This operation may be considered in selected cases of unilateral or bilateral upper lobe cavities, provided of course that intrapleural pneumothorax has been attempted and found impossible because of adhesions. There is rarely any shock to this operation. It can be done under local anesthesia and is applicable to patients who are poor surgical risks, who could not undergo the standard type of thoracoplasty and who by no means could withstand the radical apicolysis of Semb.

The fact that the parietal pleura can be fairly readily stripped from the endothoracic fascia has resulted in the development of a number of extrapleural procedures. Extrapleural pneumothorax is particularly valuable in apical or upper lung lesions in which a selective collapse would appear to be adequate. It has the advantages of being a one stage operation and fairly free from shock, which enables it to be used in some cases in which thoracoplasty is contraindicated on account of age or general condition. In addition, the slight scar resulting and the absence of subsequent deformity all weigh heavily in its favor. It is highly selective and con-

8. Semb, Carl: Thoracoplasty with Extrascapular Apicolysis, *Acta chir. Scandinav.* (suppl. 37, art. 2) 76: 1-85, 1935; *Brit. M. J.* 2: 650. 656 (Oct. 2) 1937.
9. Gale, J. W., and Midelfart, P. A.: Extrascapular Apicolysis, *Surgery* 3: 234-259 (Feb.) 1938.

serves healthy lung tissue. The necessity of giving constant refills of air afterward and the fact that they must be given fairly often and with extreme care lest the expanding lung be injured are among the obvious drawbacks. For these reasons many of these extrapleural spaces are now being filled with oil, and these patients then have an extrapleural oleothorax.

EXTRAPLEURAL PACK

I have developed an extrapleural procedure which eliminates most of the aforementioned disadvantages. The extrapleural space is maintained by filling it with a pack fashioned of flexitissue, which, being completely inert when buried in the tissue, can be left in this space indefinitely. I now have a number of patients who have been carrying these packs for more than two years and who are working and apparently well. The pack should ordinarily be left in place for from six months to two or three years. On removal of the pack the space behaves like an abandoned pneumothorax cavity and is filled either with a serous exudate or by the expanding lung. The collapse secured by this means is constant and probably more highly selective than that obtained by any other collapse procedure. The necessity for refills is eliminated. I am now employing the procedure in preference to a limited upper phase thoracoplasty in almost all cases; it can also be used as a supplementary procedure in cases of residual cavity following thoracoplasty. The results obtained by it in more than sixty cases have been most satisfactory.

A further extension of this extrapleural stripping can also be done by the closed method under thoracoscopic vision. By this means large surface to surface adhesions, which are rendering a pneumothorax ineffectual, can be stripped from the chest wall. I have devised a cutting instrument¹⁰ for intrapleural use by which the pleura is cut outside the line of lung attachment and then, with the flat side of the instrument, the lung is peeled off the chest wall with the two layers of pleura adherent to it. By this means a type of adhesion hitherto considered inoperable is now amenable to a closed intrapleural technic.

Numerous other operative methods of securing local rest for the diseased part of the lung have been tried from time to time. The transpleural aspiration of tuberculous cavities advocated by Monaldi (according to the report by Grass¹¹ at the Forlanini clinic in Rome) is now being tried in this country. It is too early to evaluate the results. Lobectomy and pneumonectomy have not as yet earned a place in the therapy of tuberculosis, although they have been successfully employed in isolated cases.

CONCLUSIONS

There is much cause for optimism regarding the treatment and curability of tuberculosis at the present time. The rapid progress which has been made in this field is due to earlier diagnosis as a result of improved and intensified methods of case finding, the universal availability of pneumothorax treatment and the increasing cooperation between phthisiotherapists and thoracic surgeons. Further refinements in technic and the standardization of collapse procedures already developed and available should continue to improve the outlook for the victims of this disease.

1004 Stevens Building.

ABSTRACT OF DISCUSSION

ON PAPERS OF DRS. MYERS, HARRINGTON, SPRAGUE (R.N.)
AND PÉREZ, DR. KINGHORN AND DR. MATSON

DR. RUTH E. BOYNTON, Minneapolis: The importance of the use of the tuberculin test in the diagnosis and epidemiology of tuberculosis has been emphasized in the papers of Dr. Myers and his associates and Dr. Kinghorn, who referred particularly to the use of the tuberculin test in students in medicine and nursing. At the University of Minnesota, all students in the schools of medicine and nursing are given tuberculin tests on entrance, and those showing no reaction to the test are retested periodically. A nonreactor who subsequently reacts to the test can mean but one thing, that during the interval the student has been exposed to a tuberculous individual. We have attempted in all such cases to trace the source of the infection. In some cases there has been a known exposure in a tuberculosis service. In others with no known exposure, careful checking has shown an unrecognized case of tuberculosis in a patient admitted to the general hospital in the surgical or medical service for some nontuberculous condition. A few years ago a student nurse who had been a nonreactor until her senior year became tuberculin positive and within a few weeks developed a pleurisy with effusion which was proved tuberculous. She had been caring for a patient on whom a diagnosis of pneumonia had been made but who later was found to have tuberculosis. To prevent the possibility of unrecognized cases of tuberculosis occurring in the University Hospital, three years ago the hospital instituted a plan to detect and pick up these cases of tuberculosis on admission. Each new admission to the hospital is now examined fluoroscopically and if the results are suggestive the patient is roentgenographed. A much more serious source of infection to students in nursing and medicine is the known tuberculous patient in a tuberculosis service. In a study reported a year ago, it was found that 22 per cent of a group of tuberculin-negative student nurses became reactors after spending six weeks in a tuberculosis service, an infection rate five times as great as that which occurred in the nurses in the general service. Such information obtained by the use of a simple procedure such as the tuberculin test gives information of the greatest value in tracing the source of infection in these students as well as pointing out the fact that these are the students who must be carefully watched for the development of signs of the disease.

DR. LOUIS HAMMAN, Baltimore: Those fortunate enough to have heard Dr. Kinghorn speak about the diagnosis of pulmonary tuberculosis fifteen or twenty years ago must have been a little surprised by his discussion this afternoon. In those earlier years he was accustomed to consider in detail the importance and relative value of all methods of examination; today, although in the introduction he stated clearly that no method of getting information should be neglected, he has given his attention almost exclusively to the roentgen ray. This change of emphasis is shared by most authorities in this field. I do not criticize the attitude. I agree with everything that Dr. Kinghorn has said about the value of roentgenograms in this field and yet I fear that too exclusive an emphasis on the roentgen ray may lead some to abandon or neglect the old methods of examination, which I believe still to be useful, and may leave the impression that the roentgen ray has become so precise that all difficulty has vanished from this field of diagnosis. Most seasoned practitioners will agree that percussion and auscultation are not now practiced as assiduously as they were in former years. Indeed, in some quarters there is a tendency hurriedly to leave the examining stool and the bedside to spend most of the time before the viewing box. It is pertinent to point out that the material Dr. Kinghorn has worked with is different from the material seen daily by physicians practicing in large general hospitals. Dr. Kinghorn sees mostly cases in which the question of diagnosis is whether the patient has pulmonary tuberculosis or has not, and patients under treatment in whom the diagnosis has been established. In the large general hospital physicians encounter patients with more acute or unusual forms of pulmonary tuberculosis under circumstances when tuberculosis must be distinguished from all other forms of pulmonary disease. In this field of differential diagnosis the roentgen ray is indispensable but it is far from infallible. The diagnosis depends on a careful consideration of all the clinical evidence and if we rely

10. The pleurotome, manufactured by the George P. Pilling & Son Company, Philadelphia.

11. Grass, Heinrich: Cure of Cavities by Suction Drainage According to Monaldi, *Ztschr. f. Tuberk.* 84: 1-120 (Dec.) 1939.

exclusively or even preponderantly on the roentgenogram many errors will be made.

DR. ALEXIUS M. FORSTER, Colorado Springs, Colo.: Dr. Matson mentions the triad of rest, fresh air and good food, and in his practice they still play a vital part. However, he stresses the remarkable advance of surgery in the treatment of pulmonary tuberculosis. I believe that any doctor treating tuberculosis today who fails to offer his patient, at the proper time or in their proper order, one or several of the surgical measures recommended by Dr. Matson is recreant in the performance of his duty. However, time is an important element in the treatment of tuberculosis and undue haste can do the patient as much harm as delay. There are so many new measures and improvements in technic that it takes wide experience to fit to the patient, at the proper time and in the proper order, each of the many measures which help in giving localized rest to diseased areas. Dr. Matson did not have the time to mention some of the minor but still helpful ones, such as postural rest, shot bars and some of the mechanical braces. Time also teaches us to avoid some of the bad after-effects of mechanical interference with the operation of the respiratory apparatus. There are many measures which, like pneumothorax, offer localized rest to the diseased area. Bronchoscopy has made a place for itself in the treatment of tuberculosis but, like other measures, must be used with gentleness and judgment. Anesthesia, with the use of oxygen and other methods of preparation and after-care, does much to make for success or failure. We welcome the detailed interest of the general practitioner and surgeon in this spectacular advance, but we wish to impress on them the woful lack of interest shown by the profession as a whole in the apparently prosaic measures needed by every doctor if we are to find the cases promptly for the adequate application of treatment. Doctors are sadly remiss in leaving too much to public health agencies and lay groups the whole problem of case finding.

BENIGN GYNECOLOGIC HEMORRHAGES

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Uterine bleeding other than the normal physiologic loss of blood during menstruation is probably one of the most frequent conditions that the general practitioner, as well as the gynecologist, has to contend with, and a correct diagnosis as to whether it is of benign or malignant origin may be of vital importance.

The causes of benign hemorrhage may be classified as follows:

1. Functional hemorrhages as a result of endocrine dysfunction and imbalance occurring at puberty, during the childbearing period and at the menopause when there is no demonstrable lesion.
2. Hemorrhages associated with neoplastic diseases including cervical and corporeal polyps, myomas, adenomyosis and ovarian tumors.
3. Hemorrhages associated with inflammatory disease, as salpingitis, oophoritis and tuberculosis.
4. Bleeding from retained gestational products after abortion or full term delivery, and tubal pregnancy.
5. Intra-abdominal hemorrhage as a result of ectopic pregnancy, endometriosis and ruptured ovarian cysts and myomas.
6. Uterine bleeding from miscellaneous causes, such as cervicitis with erosion, subinvolution, hemophilia, hypertension and postoperative hemorrhage.

FREQUENCY AND ETIOLOGY

In the past ten years the gynecologic discharges at the Woman's Hospital, New York, numbered 19,603.

Prepared for chairman's address, Round Table Conference of the American Congress of Obstetrics and Gynecology, Cleveland, in September 1939, and read by Dr. L. E. Burch, Nashville, Tenn.

Severe hemorrhage as a predominant symptom occurred in 371 cases, or nearly 2 per cent. It was present in 254 tubal pregnancies, as a complication in four cases of carcinoma of the fundus and in fifty-three cases of carcinoma of the cervix. Secondary hemorrhage as a postoperative complication occurred in twenty-six cases of amputation of the cervix, in twenty-three cases of cauterization or conization of the cervix, in one case of plastic operation on the pelvic floor and in eight cases of plastic operation on the vaginal walls. There were two cases of hemorrhage in which the cause was undetermined.

Weintraub of Brooklyn in a recent report found the frequency of uterine hemorrhage among 4,421 patients admitted for gynecologic conditions other than pregnancy to be 738, or 16.6 per cent. The commonest single cause was fibromyomas, 46 per cent. Endometrial hyperplasia occurred in 23.7 per cent of the cases, usually associated with follicular cysts of the ovary. In 9.2 per cent it was due to fibrosis uteri, in 6.6 per cent to cervical or fundal polyps and in 3.7 per cent to malignant growths.

Floyd Keene of Philadelphia studied 782 cases of postmenopausal bleeding and found that 60 per cent were due to malignant tumors; 78.4 per cent were associated with some form of neoplastic disease of the cervix, fundus or adnexa, and 75.4 per cent of these were malignant. In over half the entire series bleeding was of cervical origin, and 56 per cent of these lesions were malignant; 40 per cent were fundal in origin, of which 61.5 per cent were malignant. In thirty-eight cases no organic lesion could be found.

Howard Taylor Jr. of New York, in a study of 406 cases of postmenopausal bleeding, and TeLinde of Johns Hopkins University, in 349 cases, found approximate percentages.

Postmenopausal bleeding, especially after a year, therefore, is always important, as with a normal cervix it is of malignant origin in two thirds of the cases.

FUNCTIONAL HEMORRHAGE

Uterine hemorrhage may be regarded as functional only when no general or local lesion can be found, the bleeding symptoms in all cases being similar. Functional bleeding may occur during adolescence or the reproductive period, at the menopause and later. The accepted theory is that it is due to an upset in the ovarian rhythm. There is an excess of estrogen from persisting ovarian follicles and a deficiency of progesterone, the inhibiting hormone of the corpus luteum. This results in an excessive growth of the endometrium and the absence or defect of a premenstrual phase, so that it disintegrates into abnormal, prolonged and excessive bleeding.

The function of the ovaries is governed and activated by the anterior pituitary through the follicle stimulating and luteinizing factors; therefore any failure or deficiency of the function of the anterior pituitary will result in ovarian dysfunction. The abnormal bleeding associated with adolescence will frequently be corrected naturally.

As the cyclic phase of the endometrium reflects the ovarian activity, a biopsy of the endometrium is essential as an index of the ovarian function in all cases of functional bleeding, and the most commonly observed change is hyperplasia, frequently of the polypoid or Swiss cheese type.

The thyroid is an important factor in adolescence; hyperthyroidism or hypothyroidism may be a factor in irregular bleeding, and the basal metabolic rate should

be ascertained and the appropriate therapy employed. Progesterone to stimulate luteinization may correct the irregularity, or the anterior pituitary-like luteinizing principle, such as chorionic gonadotropin, may be successful, as the common defect in all functional bleeding is the absence of the corpus luteum, the formation of which is caused by progesterone.

Fatal functional bleeding has occurred in adolescence. Hamblen of Duke University has reported a case in a 15 year old patient with atrophic endometrium, the severe ovarian failure being probably due to the low level of estrogen.

Injections of moccasin snake venom have been employed with success in seventeen of twenty cases of functional bleeding by Goldberger of New York. He states that it is of no value with fibroids.

In adolescence, when the blood loss is a serious menace and endocrine therapy has failed, repeated curettage should be tried, and as a last resort small intra-uterine doses of radium may be employed, with from 200 to 300 milligram hours as the maximum, which may be repeated if necessary. The danger of sterilization from larger doses is definite.

As functional uterine bleeding may be due to excessive stimulation of the anterior pituitary, Turpault in France and Foss in England report good results from administration of testosterone propionate in attempts to control this excessive function. B  cl  re of Paris believes that the results with testis hormone are encouraging, but since large doses are required he cautions with regard to the unpleasant symptoms which may be produced, such as acne, hirsutism, gain in weight and voice changes.

Functional bleeding in women of the childbearing age should always have a diagnostic endometrial biopsy, and if endocrine therapy fails a curettage and intra-uterine application of radium of from 300 to 400 milligram hours is indicated. We have found that 600 milligram hours is within the danger zone of sterilization.

Norris and Behney of Philadelphia, in 1,437 cases of benign hemorrhage, found that in 750 cases it was functional and in 687 due to myomas. Using intra-uterine radium therapy they had satisfactory results in 83 per cent, relapses developed ten years or more afterward in 3 per cent, and carcinoma developed after irradiation in 1.09 per cent.

In functional bleeding at the menopause or after, the most satisfactory treatment comprises a diagnostic curettage to rule out possible malignant disease and the intra-uterine application of radium. A dose of 1,800 milligram hours is an average amount to insure permanent stoppage of the bleeding. I believe that this is preferable to ovarian irradiation with x-rays. Transfusion should be used in cases with low hemoglobin. The theory that functional uterine bleeding is invariably associated with hyperplasia of the endometrium cannot be accepted. Jones of Johns Hopkins University found that in 14 per cent of eighty-three consecutive cases bleeding was associated with the secretory phase of the endometrium.

If in a case of postmenopausal bleeding with a slightly enlarged uterus and ovary the biopsy reveals hyperplasia of the endometrium, a granulosa cell tumor should be suspected.

NEOPLASTIC DISEASES

Cervical and fundal submucous polyps are prone to hemorrhage of a continuous "spotting" type, especially after coitus, douche or exercise, with menorrhagia at the period time, and usually a polypoid type of endo-

metrial hyperplasia is present. The treatment is curettage and operation.

Cervical or fundal submucous myomas are prone to severe and dangerous bleeding, probably as a result of necrosis and ulceration. Myomas that do not invade or encroach on the endometrium are not the cause of uterine bleeding, as many suppose. There is a prevalent conception that abnormal bleeding is a specific characteristic of fibroids entirely distinct from hemorrhage from nonmyomatous uteri. As Graves of Boston has emphasized, the processes that lead to bleeding are hormonal and not dependent on the myomatous growth itself. The bleeding, then, in nonmyomatous and in myomatous uteri are identical in origin—hormonal.

There is no bleeding or change in the endometrium in fibroid conditions unless there are cystic changes and absence or defect in the corpus luteum of the ovaries, the exception to this occurring with the submucous myomas. In such cases there is an abnormal vascularity of the growth, and the area of the uterine cavity is increased. The contractions of the uterus and the corrosive action of the menstrual ferment trypsin all favor rupture of the delicate superficial vessels on the surface of the submucous growth, and necrosis or trauma causes rupture with resulting menorrhagia or metrorrhagia with clots. This is always of a venous type and may be controlled by packing.

Bleeding from a fibroid uterus after the menopause is always to be considered of importance. It may arise from a necrotic submucous growth, sarcoma or carcinoma.

Surgical therapy is indicated for bleeding myomatous uteri as a general rule. In the childbearing age myomectomy with removal of a submucous growth by vaginal hysterotomy may be possible. If the myomatous invasion of the uterine musculature is too extensive hysterectomy is indicated, with conservation of the ovaries in young women.

In the third or fourth decade irradiation is not suitable for bleeding with myomas, as a sterilizing dose is necessary to cure. An inadequate, nonsterilizing dose will give temporary relief of the bleeding, but the myomas will develop further. In the fifth decade irradiation is excellent for abnormal bleeding with associated small intramural growths. A sterilizing dose must be given so as to destroy the ovaries. In such cases radium is preferable to roentgen therapy in my hands.

Radium is of no use in the treatment of postclimacteric fibroids without bleeding. If the growths produce pressure symptoms, hysterectomy is necessary.

Adenomyosis is a non-neoplastic disease but is due to an invasion of endometrial glands into the uterine muscle tissue with resulting hypertrophy. Sampson's theory of endometriosis may account for the invasion of the musculature of gland elements. Abnormal bleeding is the most important symptom, usually with profuse menorrhagia and a symmetrically enlarged uterus without intermenstrual flow. Radiation therapy is of little benefit in this type of disease, and its failure to relieve the bleeding may be of diagnostic value. Surgical treatment is indicated.

Generally speaking, benign ovarian neoplasms are symptom free as to bleeding, and until their size is considerable or complications set in they are frequently not discovered. Cystic degeneration of the ovaries may develop prolonged menstruation or spotting as a result of the imperfect formation of the corpus luteum, especially if there is formation of a corpus luteum cyst. Simple follicular cysts frequently cause no menstrual

irregularity. Only about 12 per cent of patients with dermoids have menstrual disorders, and this is true of pseudomucinous cystadenomas also. The granulosa cell type of tumor, however, is frequently associated with bleeding.

Endometriosis is essentially a premenopausal disease, and in over 50 per cent of cases menorrhagia or metrorrhagia is present, but these cases are usually associated with uterine and ovarian pathologic change.

RETAINED PRODUCTS OF GESTATION

One of the most common causes of excessive and prolonged uterine bleeding is the retention of gestational products following labor or abortion. Consequently this should always be borne in mind if a careful history reveals any delay in a previous menstrual period. In ectopic gestation spotting or metrorrhagia is almost always associated with the other characteristic symptoms. After the death of the embryo, bleeding usually ceases.

INFECTIONS

In acute and subacute tubal and ovarian infection menorrhagia, increased frequency and occasionally metrorrhagia are symptoms, and with the associated pain they complicate the differential diagnosis from tubal pregnancy. The pelvic congestion and disturbance of the ovarian function are the cause.

Tuberculosis of the tubes, which is usually secondary to tuberculosis elsewhere, may be associated with irregular or excessive menstruation, but it is not the rule.

INTRA-ABDOMINAL HEMORRHAGE

The most common forms of intra-abdominal hemorrhage of genital origin is that which is associated with ectopic pregnancy, which may vary from slight to very extensive bleeding. In the cases with intermittent bursts of bleeding, a study of the white blood count is of diagnostic value, as shown by Farrar. With each bleeding there is a definite rise in the white count followed by a recession as the blood is absorbed. In excessive bleeding reflex shoulder pain is present, and Cullen has observed bluish discoloration of the umbilicus. Intra-abdominal hemorrhage may occur from rupture of the pedicle of a pedunculated myoma; also torsion of such a growth may cause rupture of the superficial veins, and necrosis in such a case may result in dangerous or even fatal hemorrhage.

Jones of Texas has reported three cases of massive abdominal hemorrhage from a ruptured corpus luteum cyst. These occurred on the fifth, sixteenth and twenty-first postmenstrual days.

Sackett of New York and Harris and Groper of San Francisco have reported similar instances. Hoyt and Meigs of Massachusetts and Couvert of France also report cases. Guillemain of France cites a case of a 16 year old girl, a hemophiliac, who had a severe intra-peritoneal hemorrhage as the result of rupture of a graafian follicle, and who ten months later had a similar rupture on the other side. Hemorrhage from rupture of a follicle is more common than generally realized. Greenhill of Chicago has had five cases, one with a recurrence on the opposite side.

In all such cases the ovary should be conserved if possible, the cyst lining being removed and the ovary sutured. Trauma may produce rupture of ovarian cysts with resulting shock and hemorrhage.

MISCELLANEOUS CAUSES

Among the miscellaneous causes of uterine bleeding may be mentioned marked cervical erosions, which frequently give rise to spotting after coitus or douches.

The same symptom may occur in senile vaginitis. Hypertension producing arteriosclerosis of the uterine vessels may be a cause of bleeding, which thus is analogous to epistaxis. Disease of the thyroid may cause irregular uterine bleeding. Constitutional diseases as an etiologic factor are rare, although typhoid, pneumonia, influenza, chronic valvular disease, diabetes, hemophilia, scurvy and syphilis may have a tendency to produce menorrhagia. The treatment of all the conditions mentioned is to remove the cause.

TRAUMA

Accidents producing injury of the external genitalia are a frequent cause of severe hemorrhage, especially if the venous plexuses in the labia are lacerated. Many cases of severe hemorrhage following defloration have been reported.

Not infrequently troublesome hemorrhage may follow a plastic operation on the cervix, vagina or perineum. This type of bleeding is prone to occur after amputation of the cervix, usually about the tenth day, and may be a serious complication. It is a secondary hemorrhage requiring suturing and frequently transfusion. Primary bleeding usually comes from an artery in the vaginal wall or pelvic floor. Severe hemorrhage has occurred after conization of the cervix with the high frequency knife.

Finally, physicians, as well as women, should be cautioned as to the danger of regarding irregular bleeding at the menopause age as normal. In every case it should be considered as possibly malignant until this is disproved.

101 East Eightieth Street.

Clinical Notes, Suggestions and New Instruments

THE DANGER OF GOLD SALT THERAPY

REPORT OF FATAL CASE

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AND

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During the past two decades the use of gold salts in the treatment of various diseases has become increasingly popular. In particular, the therapy of so-called chronic atrophic arthritis has resulted in an increasing number of favorable reports. In a series of 900 cases, Hartfall, Garland and Goldie¹ reported apparent cure or striking improvement in 80 per cent. Forestier² records good results in at least 70 per cent of his cases. In the series of Copeman and Tegner,³ 94 per cent showed demonstrable improvement. In general it may be said that cures have been accomplished in an average of 10 per cent of foreign cases and in from 0 to 6 per cent of American cases.⁴ Other diseases which are said to be benefited by gold therapy include lupus erythematosus, cutaneous tuberculids and syphilis.

There is seldom an article on the subject of gold therapy, however, which does not call specific attention both to the mild and to the severe toxic reactions which may be encountered in many cases under gold salt therapy. The literature abounds with reports of severe toxic reactions, and many deaths due directly to administration of gold salts have been recorded.

From the Department of Medicine, University of Chicago.

1. Hartfall, S. J.; Garland, H. G., and Goldie, William: *Gold Treatment of Arthritis: A Review of 900 Cases*, *Lancet* 2: 784 (Oct. 2), 838 (Oct. 9) 1937.

2. Forestier, Jacques: *Rheumatoid Arthritis and Its Treatment by Gold Salts*, *Lancet* 2: 646 (Sept. 22) 1934.

3. Copeman, W. S. C., and Tegner, William: *A Review of Gold Therapy*, *Lancet* 1: 554 (March 6) 1937.

4. *Gold Sodium Thiosulfate in Arthritis, Queries and Minor Notes*, *J. A. M. A.* 114: 2049 (May 18) 1940.

Hartfall, Garland and Goldie reported that 40 per cent of 900 patients with rheumatoid arthritis treated with gold salts showed toxic effects.

A multiplicity of reactions have been observed. Sollmann⁵ draws attention to the similarity in their toxic reactions of gold salts and arsphenamine. Driver and Weller⁶ have listed these reactions in perhaps the most logical and complete manner:

A. Immediate:

1. Anaphylactic: syncope, shock, nausea, vomiting, edema, hot flushes, tachycardia, perspiration.
2. Febrile, with malaise and headache.
3. Metallic taste in mouth.
4. Foreign protein reaction.

B. Delayed:

1. General: fever, headache, nausea, vomiting, malaise, albuminuria, hematuria, oliguria, anuria, stomatitis, ulcerative and hemorrhagic gingivitis, hepatitis with icterus, deafness.
2. Gastrointestinal: vomiting, diarrhea, ulcerative and hemorrhagic enteritis.
3. Dermal: itching, erythema, keratoderma, leukoplakia, lichen planus; urticarial, scarlatinal, morbilliform, papular, vesicular, bullous or hemorrhagic dermatitides.
4. Vascular: purpura, granulocytopenia, hypochromic anemia, aplastic anemia, hemoptysis, epistaxis, colitis, metrorrhagia, hematuria.

The use of gold salts may also cause other bizarre reactions not listed here.

The most extensively used salt is gold sodium thiosulfate, which is now becoming more readily available in increasing quantities and is advertised as possessing very low toxicity. This preparation contains 37.4 per cent of metallic gold. It is dissolved in distilled water and suitably buffered for intravenous use. The practice among most physicians is to give from 5 to 10 mg. doses weekly, gradually increasing to 50 mg. each week if no reactions occur. Total dosages now average around 1 Gm., but formerly much larger doses were used.

According to German and King,⁷ the most important contraindications to gold therapy are pregnancy, anemia, ulcerative colitis, nephritis, diabetes, hepatic disease, certain cutaneous eruptions and congestive heart disease. Other contraindications are active tuberculosis, previous purpura and previous attacks of granulocytopenia.

In view of the apparently increasing popularity of gold salt therapy and the increasing availability of the drug, we feel that it is important to add to the long series of severe reactions and fatalities by reporting a case of fatal poisoning probably due to gold salt therapy.

REPORT OF CASE

History.—Mrs. N. M., a widow aged 47, Italian, admitted to the Albert Merritt Billings Hospital on March 7, 1940, complained of nausea, vomiting, fever, diarrhea and dry mouth of two weeks' duration. Her symptoms began with fever, followed by a series of vomiting episodes and dull pain in the lower part of the abdomen. On the second day she began to have frequent loose, watery green stools. The fever continued, the nausea and vomiting increased and on the third day after the onset she vomited everything she swallowed. The pain in the lower part of the abdomen abated somewhat after the first two days. The symptoms continued, and on the seventh day a local physician was called who made a diagnosis of enteritis of unknown origin. Sodium salicylate was prescribed, since the patient also complained of pain in the muscles of her back and legs. The illness continued with persistent nausea, vomiting and diarrhea, averaging from eight to twelve stools daily, and on the thirteenth day the physician was again called. This time he advised immediate hospitalization in order that she might be treated more adequately.

On the next day, fourteen days after the onset, the patient was admitted to the hospital. At this time it was revealed that she had received intravenous gold sodium thiosulfate the previous month because of arthritis of the right shoulder. This drug had been given by another local physician. The initial

dose was 50 mg., repeated three or more times from January 29 to February 15, and on February 22 the onset of the symptoms occurred. The total dosage used in this case was 200 mg. The physician who gave this drug reported that she had shown no evidence of any toxicity until after the last injection.

Examination.—On admission the patient was well developed and moderately obese, of dark complexion and markedly dehydrated, and she complained bitterly about a dry burning sensation in her mouth. She was having frequent dark green liquid stools. The oral temperature was 97.2 F., pulse 78, respiratory rate 22 and blood pressure 130 systolic, 95 diastolic. The mucous membranes of the mouth were dry, hyperemic and slightly swollen, but no ulceration was seen. The abdomen was moderately obese, soft and slightly tympanitic, with moderate discomfort on deep pressure suprapubically, without rebound tenderness.

The hemoglobin content was 11.6 Gm. (Sahli), the red blood count numbered 4,500,000 and the white cells 14,000, with a differential count of 80 per cent segmented forms, 11 per cent lymphocytes, 8 per cent monocytes and 1 per cent eosinophils. Thirty per cent of the segmented forms were immature. Urinalysis showed a specific gravity of 1.030, no albumin, sugar or casts, a trace of acetone and occasional leukocytes in the sediment. The stools were liquid green, were foul smelling, contained some mucus and gave a one to three plus benzidine reaction. Eleven consecutive stools cultured on litmus-lactose agar, desoxycholate citrate agar and blood agar were negative for pathogens. No parasites, ova or amebas were found. Serum agglutinations for typhoid, paratyphoid A and B, Sonne and Flexner dysentery, and Brucella melitensis were negative.

The patient was given fluids immediately, both intravenously and subcutaneously. She continued to have frequent stools, seven on the first day, nine on the second, twelve on the third, nine on the fourth and one on the fifth and sixth days. On the second day her temperature rose to 101.4 F. and the pulse rate to 138. She continued to complain of a sore and dry mouth, although she did not now appear to be dehydrated. In spite of continued supportive measures she appeared to be getting sicker. On the third day she started menstruating.

On the sixth day after admission the patient ceased having stools; her urine continued to be clear except for a trace of sugar. Blood chemistry reports at this time showed a nonprotein nitrogen of 58 mg. per hundred cubic centimeters, fasting sugar 178 mg., serum chlorides 101 millimols per liter, serum p_{H} 7.32, carbon dioxide content 13.7 millimols per liter and a negative van den Bergh reaction and icteric index. On the next day the fasting sugar was again 178 mg., serum p_{H} 7.35 and carbon dioxide content 18.9 millimols per liter. Both fasting blood sugars were taken at least ten hours after parenteral fluids had been given.

The daily leukocyte count was always between 14,000 and 18,000. The parenteral fluid intake on the fourth day was 5,700 cc. and on the fifth day 7,100 cc. Also on the sixth day the patient became dyspneic and very nauseated. Terminal paralytic ileus developed, and 1,200 cc. of dark nonfecal liquid was removed by duodenal drainage. The rectal temperature rose to 103 F. and the pulse rate was 160. On the seventh day she became delirious and died quietly.

Autopsy.—An autopsy was performed two hours after death.

Gross Appearance: The small intestine was markedly distended without obstruction or evidence of peritonitis. The duodenum and jejunum appeared normal, although the mucosa of the jejunum was moderately edematous. The entire mucosa of the ileum was pale and smooth, covered in places with a yellowish green exudate. In other places ulcers 1 by 3 mm. extended into the submucosa. In the colon were large areas in which the mucosa was hemorrhagic and finely granular. The mesenteric lymph nodes were small and pale. The gastric mucosa, especially in the cardia, was covered with petechial hemorrhages. The liver weighed 2,000 Gm. and was quite friable, and the cut surfaces bulged markedly. The spleen weighed 180 Gm., its tissue being soft and nonresistant. Each kidney weighed 180 Gm.; aside from marked cloudy swelling they appeared normal. The lumbar and costal bone marrow was bright red.

Microscopic Appearance: The esophagus showed slight erosion of the mucosa. The gastric mucosa showed atrophic gas-

5. Sollmann, Torald: *A Manual of Pharmacology*, ed. 5, Philadelphia, W. B. Saunders Company, 1936, p. 1009.

6. Driver, J. R., and Weller, J. N.: *Untoward Results from the Use of Gold Compounds: Report of a Fatal Case*, *Arch. Dermat. & Syph.* 23: 87 (Jan.) 1931.

7. German, J. D., and King, R. L.: *The Use of Gold Salts in Arthritis*, *Clin. Virginia Mason Hosp.* 19: 1 (March) 1940.

tritis with many superimposed acute petechial hemorrhages. There was marked duodenitis with sloughing of much of the glandular epithelium. Remnants of atrophic glands were scattered between others which were large and hyperplastic. There was massive infiltration of the villi and submucosa with plasma cells, macrophages, lymphocytes and a few eosinophils. The jejunum showed more marked sloughing of the epithelium and inflammatory changes. The submucosa and muscularis of the jejunum were edematous. The entire glandular epithelium of the ileum was missing. The remaining eroded mucosa was edematous and filled with polymorphonuclear leukocytes, plasma cells, lymphocytes and some eosinophils. There was a thick fibrinopurulent membrane adherent to the surface in some areas. In a few regions small areas of ulceration extended through the muscularis mucosae. In the colon the surface epithelium had sloughed and the glands were scattered far apart and shallow. Many were cystic and filled with exudate; others were hyperplastic. There was the same intense cellular reaction interstitially as in the small bowel, with the added feature of many macrophages filled with brown pigment.

The epithelium of many of the convoluted tubules of the kidneys was swollen and vacuolated, and a few of the nuclei were absent. The lumens of some convoluted tubules were dilated, containing much protein precipitate and a few homogeneous casts. In some of the collecting tubules the epithelial cells were atrophic, eosinophilic and occasionally without nuclei. Fat stains showed slight focal fatty degeneration in the collect-

as a direct result of profound toxic reactions resulting from gold salt therapy.

Experimentally produced reactions in animals have yielded characteristic results similar to those found in human beings. Brown, Saleeby and Schamberg⁹ administered large amounts of gold salt to rabbits. They demonstrated that the kidneys showed swollen glomerular tufts, convoluted tubules and congested blood vessels. In the liver there was also congestion of capillaries, necrosis of parenchymal cells around the central veins and slight fatty changes and granulation in peripheral cells. The spleen showed enormous amounts of erythrocytes and brownish granules both inside and outside of the phagocytes, which they interpreted as being particles of gold. The hearts were normal and the lungs showed marked congestion with conglutination of erythrocytes in the vessels. An interesting feature in their animals was an elevated blood sugar content. In the case cited here the fasting blood sugar was 178 mg. per hundred cubic centimeters on successive days, and no part of the patient's history or admission examination suggested hyperglycemia. Both specimens were taken at least ten hours after parenteral fluids had been given.

McCluskey and Eichelberger¹⁰ found that intravenous injections of gold salts in dogs produced diarrhea, albuminuria and vomiting and that the elimination of gold was carried out principally by the kidneys. There was some gold recovered from the stools also.

Goldhammer¹¹ reports the case of a woman aged 47 treated for chronic rheumatism with intramuscular gold salts. This case terminated fatally in a manner strikingly similar to the one presented here. The total dosage in his case was 0.24 Gm. of Solganol (disodium salt of 4-sulfomethyl-amino-2-auro mercaptophenyl-sulfonic acid) administered in six doses, starting with the low initial dose of 0.01 Gm. The presenting symptoms were weakness, cyanosis and fever. This was followed shortly by erythema, pain in the lower part of the abdomen and frequent watery mucoid stools which later became gray-green and foul smelling. Serum agglutinations and repeated stool cultures were also negative for all known pathogens. Death followed in twelve days after the onset of symptoms in spite of continued supportive measures. The autopsy revealed extensive mucosal edema and hemorrhages in the greater part of the small and the large intestine. There was also atrophy of the parenchymal liver cells. An unsuccessful attempt was made to demonstrate gold in the tissues. This case bears out the statement of Driver and Weller⁶ that even small doses of gold given with great care may result in reactions in some cases. Goldhammer's patient and our patient were both women aged 47 treated for chronic rheumatism. The outstanding symptoms were fever and diarrhea, with negative stool cultures and serum agglutinations. The autopsies were also very similar. In our case the initial dose of gold sodium thiosulfate injected was considerably greater than that recommended by the manufacturer, but in Goldhammer's case the initial dose was very small and subsequently carefully controlled.

Perry¹² reports a severe attack of diarrhea with much blood and mucus in the stools in a case under treatment for lupus erythematosus with five injections of gold sodium thiosulfate. The patient recovered in two months after prolonged treatment. Emphasis should be given to the fact that in our case and indeed in other cases reported the symptoms appeared after administration of the drug had been discontinued and, as is so often the case in cinchophen poisoning, progressed to death in spite of treatment. Margolis and Eisenstein¹³ in a recent review of gold salt therapy in the treatment of rheumatoid arthritis find that the medical consensus is that it is not sufficiently beneficial to justify the risk involved. They conclude

Gold Content of Tissues on Chemical Analysis

Tissue	Weight of Tissue	Gold, Gm.	Gold Concentration, Mg./100 Gm. of Tissue
Analyzed fresh; kidney.....	96	0.0024	2.5
Analyzed after fixation with Kaiserling I and washed in water:			
Kidney.....	45	0.0009	2.0
Ileum.....	180	0.0002	0.1
Jejunum.....	60	0.0001	0.2
Colon.....	120	0.0002	0.2
Fat from colon.....	355	None	0
Spleen.....	94	0.0032	3.4
Lung.....	205	0.0002	0.1
Liver.....	100	0.0006	0.6

Tests for other metals (lead, mercury, arsenic) gave negative results.

ing tubules. The microscopic picture was perhaps compatible with a mild healing nephrosis.

There was moderate fatty infiltration of the liver. The remaining liver cells were swollen, and many contained giant or multiple nuclei.

In the spleen there was hyperplasia of the red pulp and focal areas of fibrin and hemorrhage in the malpighian bodies.

The lungs showed acute bronchitis with early bronchopneumonia. The abdominal lymph nodes were hyperplastic but not suppurative. Normal conditions were present in the myocardium, pancreas, adrenals, thyroid, breasts, ovaries, uterus, vagina and lumbar marrow.

Bacteriologic cultures taken at autopsy from the ileum and colon yielded negative results for pathogenic organisms, and culture from the heart's blood yielded no growth. Histochemical tests failed to show definite evidence of gold in the tissues. The anatomic diagnosis was (1) atypical, massive, subacute and focally ulcerative ileitis, (2) atypical subacute colitis, proctitis, jejunitis and duodenitis, (3) atrophic gastritis, (4) possibly mild healing nephrosis, (5) moderate fatty infiltration of the liver, (6) hyperplasia of the red pulp of the spleen and (7) acute bronchitis and early bronchopneumonia.

Specimens of the kidney, liver, spleen and gastrointestinal tract were submitted to the Cook County coroner's toxicologist;⁸ the gold content found in the analysis is given in the accompanying table.

COMMENT

From the history, clinical course, autopsy, chemical analyses and an extensive review of the available literature on gold poisoning, it seems to us quite probable that this patient died

8. Dr. C. W. Muehlberger made the chemical analysis of the tissues submitted, and Dr. C. M. Flory, of the Department of Pathology, University of Chicago, cooperated in the postmortem examination.

9. Brown, H.; Saleeby, E. R., and Schamberg, J. F.: A Study of Toxic Effects of Certain Gold Compounds, as Indicated by Blood Chemistry and Pathologic Changes in Organs, *J. Pharmacol. & Exper. Therap.* **28**: 141 (July) 1926.

10. McCluskey, K. L., and Eichelberger, L.: The Effect of Injections of Sanochrysin on Normal and Tuberculous Dogs, *Am. Rev. Tuberc.* **12**: 329 (Dec.) 1925.

11. Goldhammer, Stefan: Ein Fall von tödlicher Solganal Vergiftung, *Med. Klin.* **31**: 645 (May 17) 1935.

12. Perry, M. W.: Gold Injections and Colitis, correspondence, *J. A. M. A.* **113**: 965 (Sept. 2) 1939.

13. Margolis, H. M., and Eisenstein, V. W.: Some Specific Measures in the Treatment of Rheumatoid Arthritis, *J. A. M. A.* **114**: 1429 (April 13) 1940.

that gold salts offer a promising but at present dangerous therapeutic adjunct to the armamentarium of the practitioner. It seems to us quite obvious that, if this drug is used further, many more reactions and fatalities will occur.

Treatment is largely symptomatic at present. Dextrose and sodium thiosulfate intravenously may be of some value but there is no known specific measure. The administration of liver extract, calcium gluconate and vitamins A, B and C are of questionable value. Cutaneous tests for sensitivity have also proved unreliable in certain cases.

SUMMARY

1. A case of ulcerative enteritis following the intravenous injection of gold sodium thiosulfate was fatal.

2. Clinical and experimental evidence in the literature indicates that mild, severe or fatal reactions occur in a significant percentage of cases so treated; there is no specific antidote or treatment for these reactions.

3. The use of gold salt therapy should be accompanied by full recognition of the many dangers involved.

950 East Fifty-Ninth Street.

CHROMATIC BRAIN SPECIMENS FOR TEACHING

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A new method has recently been devised whereby a human brain, or any part of it, can be colored with a small brush and colored inks,¹ causing various important areas of the brain to become immediately recognizable because of the vivid, pleasing color and also because the anatomic name of the part can be lettered on it. The student and others do not find it easy to grapple through the perplexing convolutions and the deeper, more confusing structures, seeking the known brain areas and trying to understand their function.

But if the anterior central gyrus of the hemisphere has been brushed with carmine red ink and then "Leg, Trunk, Arm, Face" lettered on it in black ink; and if the posterior central gyrus is colored green and then the informative word "Sensation" printed on it with a tiny lettering brush,² then these immensely important areas are seen at a glance. The motor speech area, or Broca's center, if brushed with yellow ink and "Speech" lettered on it makes brain anatomy still easier and also makes the brain specimen quite attractive. The visual and the auditory areas can also be colored and lettered. Then the mesial surface of the brain hemisphere can be so treated. Coronal sections and cross sections through the basal ganglions are of further help.

TECHNIC FOR MAKING CHROMATIC BRAIN SPECIMENS

Fix the brain specimen in 10 per cent solution of formaldehyde for one month. Remove from the solution, peel off the meninges and then, with a bath towel, wipe the brain specimen as dry as possible without injuring it. Formaldehyde deep in the specimen is sufficient to preserve it and will eventually seep to the surface, replacing the excess formaldehyde which has been wiped off. Protect your hands by working in thin rubber gloves! Place the brain on a sheet of white paper where there is ample light, and all is ready for painting on the colored inks. If one is coloring the motor area, prevent the carmine red from smearing the sensory area by inserting a strip of plicofilm into the central sulcus. To prevent the red from spreading to the temporal lobe below, insert another strip of plicofilm in the sylvian fissure. And while the occipital lobe is being colored green or whatever color you prefer, insert a strip of plicofilm between the occipital lobe and the cerebellum. Color whatever area you like, using hemispheres, coronal and cross sections, and using inks of carmine red, orange red, yellow, green, blue, brown, violet and black. The black is for the lettering. Before lettering let the colored ink dry in a little. Blot it a little or hold the reading lamp close to dry the specimen a bit.

To assist in lettering, wear a binocular loupe.³ This glass also assists the brain painter in picking out delicate structures in the basal ganglions and in other puzzling sectors. An attractive and helpful specimen can be made by taking a human brain hemisphere and painting the frontal lobe carmine red, the parietal lobe yellow, the occipital lobe violet, the temporal lobe green and the cerebellum brown. The motor, sensory and speech area can then be colored a little differently and lettered.

If the author becomes tired or is interrupted while brain painting he lays the specimen on a sheet of white paper inside an old roasting pan, places alongside the specimen a dish with a sponge soaked with water to prevent the specimen from drying out, and then fits on the lid of the roasting pan and runs a strip of adhesive tape around the edges of the lid. The specimen can be finished a month later, if desired.

One of course is liable to make a mistake in lettering or else may wish to remove a colored ink spot in the wrong place. Ordinary turpentine on a cotton swab will take off the lettering or the colored ink. Then blot the area and start painting again. Begin on a small specimen first. Have a small white pad of paper close by when you begin lettering, so you can try your brush before you letter. The black ink has to be applied very carefully or it will run or mar your specimen. All sorts of color schemes can be worked out to make an anatomic specimen that will make brain anatomy attractive and ever so much easier. When the specimen has been painted and dried sufficiently, seal it in plicofilm.⁴ Such a specimen can then be handled by hundreds, will last for many months and can be sent by parcel post, carried in a suit case or left out on an instructor's desk.⁵

Special Clinical Article

GONORRHEA IN THE MALE

RESULTS OF TREATMENT WITH SULFANILAMIDE CLINICAL LECTURE AT NEW YORK SESSION

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The sudden and dramatic way in which sulfanilamide was launched as a cure for gonorrhea prompted the formation of a committee to study the effectiveness of this drug. A committee composed of five representatives of the American Neisserian Medical Society and representatives from the U. S. Public Health Service initiated a prospective study to evaluate this drug in the treatment of gonorrhea in the male. The collection of records began in May 1939 and was completed in January 1940. A history form for recording clinical observations was furnished the twenty-six cooperating clinicians who offered to pool their records for this study. General instructions were issued to each clinician regarding the uniform execution of the records. In order to compare the effectiveness of sulfanilamide in the treatment of gonorrhea with the results obtained with local therapy only, it was necessary to secure a control series. Existing clinic records were found

3. Beebe binocular loupe, American Optical Company, No. 1603, \$3.75.

4. Darrah, L. W.: Sealing Brain Specimens in Plicofilm, *Arch. Neurol. & Psychiat.* 43: 1205-1207 (June) 1940.

5. Chromatic Brain Specimens for Teaching were exhibited at the International Association of Medical Museums, Mellon Institute, Pittsburgh, March 20, 1940, American Psychiatric Association, Cincinnati, May 20-24 and the American Neurological Association, Rye, N. Y., June 6-8.

Read in the Surgical Division of the General Scientific Meetings at the Ninety-First Annual Session of the American Medical Association, New York, June 11, 1940.

From the Northampton State Hospital.

1. Higgins American Waterproof Drawing Inks, Chas. M. Higgins & Co., Inc., 271 Ninth Street, Brooklyn.

2. A small lettering brush, its bristles three-eighths inch long.

inadequate to serve this purpose. Therefore the records of patients treated with local therapy by the cooperating clinicians in their private practices were used.

A large number of the 3,039 records submitted did not lend themselves to analysis. There were 144 records excluded because essential information such as admission smear or results of two glass tests were not recorded. Of the remaining 2,895 records, 1,208 were of patients who had received previous treatment and, in order that the clinical response might be definitely ascribed to the therapy administered during the study period, these were also excluded.

This left 1,687 case histories of individuals treated with either sulfanilamide, local therapy or both and to whom no previous treatment had been administered. Of these, 390 patients were followed for less than fifteen days. In evaluating the results of treatment these short time cases have been omitted, since they were under observation for too short a period to evaluate results.

No attempt was made to limit the study to records of patients who had maintained a certain schedule of treatment or for whom clinical and laboratory observation had been made at regular intervals. Since in most clinic practice there is little or no periodicity of smear and culture work, throughout the analysis the two glass test has been used as a major criterion of results of treatment. Patients with a two week period during which there were at least three observations showing a negative two glass test were classified as having a "remission." The degree of reliability of the two glass test as a criterion of remission was estimated in terms of the relapses and ultimate clinical results obtained in remissions based on the two glass test only as compared with those in which the two glass test was substantiated by smears, cultures or both.

LAPSES

Over 60 per cent of the 1,687 previously untreated patients disappeared from observation before they had obtained a remission status. Nearly 45 per cent of them disappeared before the forty-ninth day. Table 2 depicts the rate at which these patients lapsed. To correct for these lapses in the calculation of remission rates the analyses have been made in terms of patients under observation during relatively short time periods up to forty-nine days.

REMISSIONS

Of the 965 patients treated with sulfanilamide and under observation fifteen days or longer 871 received local therapy, also, leaving only ninety-four who had received sulfanilamide alone. The control group consisted of 332 patients treated with local therapy only.

Since all patients with gonorrhea will ultimately have a remission and cure, the evaluation of the effectiveness of any type of therapy depends on the speed with which good results are obtained.

The three groups of cases were compared as to the speed and extent to which they obtained satisfactory results. These satisfactory results are expressed in two ways: "maintained remission" and end clinical result. The maintained remissions exclude those patients who obtained "remissions" but subsequently gave evidence of abnormality in the two glass test or were found to be bacteriologically positive. In determining remission rates the follow-up periods of all patients analyzed were examined out to fifty days and an expected "relapse" rate calculated for each time interval. The expected relapse rate indicates the number of relapses which would have occurred had all patients been followed for fifty days after obtaining a remission. These expected

relapses were then subtracted from the total remissions to obtain the maintained remissions.

It was found that many patients not fulfilling the criteria for remission or who relapsed after remission were classified on termination of the case as having a satisfactory clinical result within the fifty day treatment observation period. Except for the relapses, these were for the most part patients who had scattered shreds in the first glass and yet were bacteriologically negative, or in whom the period of negativity did not quite reach the necessary fourteen day period.

TABLE 1.—Rate of Appearance of Maintained Remissions and Total Satisfactory Results Showing Method of Therapy

Time After Admission	Local Only		Sulfanilamide Only		Sulfanilamide Plus Local	
	Maintained Remissions	Total Satisfactory Results	Maintained Remissions	Total Satisfactory Results	Maintained Remissions	Total Satisfactory Results
15-19 days.....	1.8%	2.1%	5.3%	7.4%	11.7%	12.9%
20-29 days.....	8.3	9.8	13.8	18.0	26.9	30.4
30-39 days.....	15.9	20.3	17.2	22.8	35.7	41.5
40-49 days.....	25.2	32.3	24.7	31.6	44.9	53.4

An example of the method used to calculate the material in this table follows: Under sulfanilamide plus local therapy, there were 871 cases under observation during the fifteen to nineteen day interval. During this period 125 patients finished a two week period during which the two glass test was negative. Of these 125 remissions, twenty subsequently relapsed. These relapses were arranged according to the time the relapse occurred after remission and the proportion of relapses was calculated for the remissions under observation in each time interval: In from one to four days after remission, two out of 122 remissions relapsed; at five to nine days, five out of 114 relapsed; at ten to fourteen days, two out of 102 relapsed; at fifteen to nineteen days, four out of ninety-two relapsed; at twenty to twenty-nine days, one out of seventy-five relapsed; at thirty to thirty-nine days, four out of fifty-nine relapsed; and at forty to forty-nine days none out of forty relapsed. The resultant percentages of relapse in these respective time intervals were 1.6, 4.4, 2.0, 4.3, 1.3, 6.8 and 0.0.

These proportions were then cumulated on a basis of 1,000 cases at risk as follows: In the one to four day period of 1,000 remissions 1.6 per cent, or sixteen, relapse, leaving 984 remissions entering the five to nine day period. Of these 984 remissions, 4.4 per cent, or forty-three, relapse, leaving 941 remissions entering the ten to fourteen day period. Of these 941 remissions, 2.0 per cent, or nineteen, relapse, leaving 922 remissions entering the fifteen to nineteen day period. Of these 922 remissions, 4.3 per cent, or forty, relapse, leaving 882 remissions entering the twenty to twenty-nine day period. Of these 882 remissions, 1.3 per cent, or eleven, relapse, leaving 871 remissions entering the thirty to thirty-nine day period. Of these 871 remissions, 6.8 per cent, or fifty-nine, relapse, leaving 812 remissions entering the forty to forty-nine day period. Of these 812 remissions there were no relapses during the forty to forty-nine day period, leaving 812 remissions at the end of forty-nine days. When these relapses were cumulated there were 1.6 per cent by the fourth day, 5.9 per cent by the ninth day, 7.8 per cent by the fourteenth day, 11.8 per cent by the nineteenth day, 12.9 per cent by the twenty-ninth day, 18.8 per cent by the thirty-ninth day and 18.8 per cent at the forty-ninth day.

This relapse rate of 18.8 per cent was then applied to the 125 remissions obtained in the fifteen to nineteen day interval and the resultant expected relapses (twenty-three) subtracted, leaving 102 maintained remissions, or 11.7 per cent of the original 871 cases under observation during the interval.

The original 125 remissions and nineteen lapses occurring during the fifteen to nineteen day interval were then subtracted from the 871 original cases under observation, leaving 727 cases entering the twenty to twenty-nine day interval. The same procedure was then followed for this twenty to twenty-nine day interval as in the fifteen to nineteen day interval, and in turn for the thirty to thirty-nine, and the forty to forty-nine day intervals. The resultant proportions of maintained remissions determined for each interval were fifteen to nineteen days, 11.7 per cent; twenty to twenty-nine days, 17.2 per cent; thirty to thirty-nine days, 12.1 per cent; forty to forty-nine days, 14.3 per cent. When these proportions were cumulated on the same basis as the cumulated relapse rates, the cumulative remission rates shown in table 1 were found.

The same method was used to derive the rates of appearance of "Total Satisfactory Results."

Within fifteen to nineteen days after beginning treatment, maintained remissions were obtained by local treatment in only 2 per cent of the cases (table 1) as compared with 5 per cent by sulfanilamide therapy and 12 per cent when local therapy was given in addition to sulfanilamide. The addition of those cases obtaining a clinically satisfactory result without fulfilling the criteria for remission does not materially increase these percentages. When the time interval of forty to forty-nine days is reached, sulfanilamide plus local therapy has obtained a cumulative maintained remission rate of 45 per cent, as compared with 25 per cent for sulfanilamide alone and 25 per cent in the cases treated by local

therapy alone. When patients obtaining a clinically satisfactory result within forty to forty-nine days are added, satisfactory results are increased to 53 per cent, 32 per cent and 32 per cent, respectively. Thus, both maintained remissions and end satisfactory results are significantly better within fifty days of treatment observation under sulfanilamide plus local therapy than when either sulfanilamide alone or local therapy are used. Sulfanilamide alone obtained a higher proportion of good results within the first month of treatment than did local therapy. After this period there was little difference in the effectiveness of the two methods.

Speed of obtaining satisfactory results is the real test in determining the effectiveness of different types of treatment. By the nineteenth day, sulfanilamide plus local therapy obtained over six times as many maintained remissions as local therapy and over twice as many as sulfanilamide alone. This rapid remission rate with sulfanilamide and local therapy is the more significant because it means that before the nineteenth day all these patients had had a two week period in which they were symptom free.

SCHEDULE OF SULFANILAMIDE THERAPY

With this evidence that sulfanilamide, either alone or in combination with local therapy, succeeded in obtaining better results before the thirtieth day, an analysis was made of the intensity of the sulfanilamide treatment within this time.

There was no significant difference in the results obtained within this important first month if sulfanilamide was given so that the patient received at least 400 grains (26 Gm.) of drug within seven days, as compared with those in whom this amount of drug was administered continuously over a twenty-one day period (30 per cent as against 29 per cent). A small number of patients treated with very low doses of less than 400 grains of the drug in a twenty-one day period obtained satisfactory results in only 5 per cent of patients by the thirtieth day. This is less than but not significantly different from the remission obtained with local therapy only.

RELIABILITY OF TWO GLASS TEST

How valuable is the two glass test in reflecting the clinical status of the disease? This study shows that the two glass test can be persistently negative for a

TABLE 2.—Rates of Lapse According to Length of Treatment Observation Period

Days After Admission	Total Patients	Lapse	Maintained Remission	Proportion of Patients Lapsing Before End of Interval
Under 6	1,087	248	0	14.7 per cent
6-14	1,439	142	0	23.1 per cent
15-19	1,297	62	113	26.8 per cent
20-29	1,122	111	153	33.4 per cent
30-39	858	86	89	38.5 per cent
40-49	683	85	88	43.5 per cent
50 plus	510	298	212	61.2 per cent
Total.....	1,032	655		

period of at least two weeks and subsequently become positive. In fact, in 175 cases with "remissions" based on the two glass test alone, 29 per cent subsequently relapsed (table 3). Half of these relapses were found in the two glass test but the other half would not have been detected without the use of cultures. This high relapse rate is in distinct contrast to that existing when the two glass test is supported by negative smears and cultures. In 275 such cases there were only four, or 1.4 per cent, relapses. Of these, three were found only by subsequent culture, while the two glass test remained

negative. The two glass test is a valuable guide to the progress of the case under treatment, but, if it is unsupported by laboratory evidence, one out of three cases will subsequently relapse. If the two glass test is supported by smears, one out of twenty will relapse, and, if followed by both negative smears and cultures, only one out of 100 may be expected to relapse.

TABLE 3.—Reliability of Two Glass Test in Terms of Relapse and Clinical Outcome

Remission Based on Two Week Period of Negative Two Glass Test with	Remissions		Relapses		Maintained Remissions		Remissions Clinically Satisfactory	
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
No smear or culture								
Local.....	25	100.0	5	20.0	20	80.0	23	92.0
Sulfanilamide.....	6	100.0	1	16.7	5	83.3	6	100.0
Sulfanilamide and local.....	144	100.0	44	30.6	100	69.4	127	88.2
Total.....	175	100.0	50	28.6	125	71.4	156	89.2
Smear or culture *								
Local.....	140	100.0	2	1.4	138	98.6	139	99.3
Sulfanilamide.....	12	100.0	1	8.3	11	91.7	11	91.7
Sulfanilamide and local.....	157	100.0	15	9.6	142	90.4	151	96.2
Total.....	309	100.0	18	5.8	291	94.2	301	97.4
Smear and culture								
Local.....	17	100.0	..	...	17	100.0	17	100.0
Sulfanilamide.....	7	100.0	..	...	7	100.0	7	100.0
Sulfanilamide and local.....	251	100.0	4	1.6	247	98.4	251	100.0
Total.....	275	100.0	4	1.4	271	98.6	275	100.0
Total								
Local.....	182	100.0	7	3.9	175	96.1	179	98.4
Sulfanilamide.....	25	100.0	2	8.0	23	92.0	24	96.0
Sulfanilamide and local.....	552	100.0	63	11.4	489	88.6	529	95.8
Grand total.....	739	100.0	72	9.5	667	90.5	732	96.4

* Only five of these 309 cases had substantiating cultures before relapse; the remaining 304 were substantiated by smears.

REACTIONS

Of 1,627 patients treated with sulfanilamide, either with or without local therapy and irrespective of previous treatment, 534 reactions were recorded as occurring in 414 patients. None of these reactions were classified as severe. Over one half of them were nervous manifestations such as insomnia, vertigo, tinnitus, headache or transient disorientation. Another fourth of the reactions were classified as gastrointestinal—anorexia, nausea, vomiting or diarrhea. Only 9 per cent of the patients were reported as having cyanosis or secondary anemia.

SUMMARY

In this study, designed to evaluate the efficacy of sulfanilamide in the treatment of gonorrhea in the male, it was found that by the end of the forty-ninth day nearly 45 per cent of the patients had lapsed from the clinics before obtaining as much as a two week period during which the two glass test was negative.

It was found that the use of sulfanilamide materially enhanced the satisfactory results early in the course of the treatment period. Sulfanilamide plus local therapy was over six times as effective in producing remissions as was local therapy alone in those cases followed during the fifteen to nineteen day interval. At the same time, sulfanilamide alone was twice as good as was local treatment alone. By the forty-ninth day, sulfanilamide plus local therapy had obtained nearly twice as many good results as did either local therapy alone or sulfanilamide alone.

If the amount of sulfanilamide given was more than 400 grains in seven days, the results were no better than if the amount administered was less than 400 grains in seven days but more than 400 grains in twenty-one

days. If less than 400 grains was given in twenty-one days, sulfanilamide plus local therapy was no better than local therapy alone.

A two week period of negative two glass tests unsupported by either a negative smear or a culture was a poor criterion of good results. Nearly one third of these patients subsequently had clinical or bacteriologic evidence of the disease. When the two week period of negative two glass tests was supported by a negative smear, only one out of twenty remissions relapsed and, when supported by both negative smears and cultures, ninety-nine out of 100 were still negative on discharge or lapse from the clinic.

Although sulfanilamide was found to be of considerable value in the treatment of the disease, if left much to be desired, since at the end of one month only 30 per cent of cases under the best type of treatment had obtained a maintained remission.

CONCLUSIONS

1. The use of sulfanilamide in the treatment of gonorrhea in the male is effective in producing a higher proportion of early clinical responses than does the use of local therapy alone.

2. Under the best circumstances, sulfanilamide plus local therapy accomplishes 30 per cent good results within the first month, as compared with 8 per cent for local therapy alone.

3. The two glass test, unsupported by either smears or cultures, while a useful clinical guide, is an unreliable index of satisfactory outcome.

COMMENT

The most striking fact that this study reveals is a high dispensary lapse rate. In some of the dispensaries participating in the study, this lapse rate was 100 per cent—that is, none of the patients were held under treatment or observation long enough to attain even a two week period in which the two glass test was negative. In few clinics was the lapse rate less than 50 per cent. This high dispensary lapse rate may go far in explaining why gonorrhea is such a widespread disease. The committee feels that there is an urgent need for an immediate correction of these shortcomings if the control of gonorrhea among dispensary patients and their contacts is to advance. It is now well recognized that if sulfanilamide is effective in the treatment of gonorrhea the patient will show a prompt response. Certainly by the fourteenth day he should be free from discharge and have a negative two glass test. In this study, those cases would fall in the remissions occurring between twenty and twenty-nine days, and in that group sulfanilamide plus local therapy had effected remissions in approximately 27 per cent of cases as against 8 per cent for local therapy without sulfanilamide. Thus, this prompt clinical response may be expected in about three out of ten patients treated with sulfanilamide plus local therapy, as against one out of ten treated with local therapy only.

In the later time intervals sulfanilamide plus local therapy continued to obtain better responses than did local therapy alone. If the hypothesis is true that the effectiveness of sulfanilamide rapidly decreases with time, a possible explanation for this observation may be that those patients receiving sulfanilamide in addition to local therapy came into the period when local therapy begins to produce effects in a much better clinical condition than did those patients who did not have sulfanilamide.

If a patient has not shown a substantial clinical response within the first week of treatment under sulf-

anilamide, it should be discontinued; and, further, the administration of sulfanilamide for more than three weeks serves no good purpose. It is felt that repeat courses of sulfanilamide are rarely effective after an initial failure, although the substitution of another sulfonamide may be quite effective. These opinions are based in part on the results of this study, additional evidence in the literature, and the clinical experience of each member of the committee.

As a large proportion of cases relapse after having had a remission based only on the two glass test, and since almost one half of the relapses occurring in the study were found by smear and culture in spite of a negative two glass test, a far wider use of smear and culture studies should be employed in tests of cure. This is, of course an ideal which will be difficult to attain. The fragility of the gonococcus between the time of taking specimens and the implanting on cultural mediums makes it impractical at the present time to utilize a laboratory far removed from the clinic. Until improved technics have been developed to eliminate this deficiency, more attention should be given to developing reliable criteria of cure other than those including cultures.

Since this study was begun, considerable evidence has accumulated in the literature which indicates that there are other sulfonamide compounds which are decidedly superior to sulfanilamide in the treatment of gonorrhea. This, together with the fact that the use of sulfanilamide as depicted in this study is so disappointing, leads us to believe that whenever public funds are expended for sulfonamide drugs they should be used to purchase those of proved greater efficacy.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING ARTICLE.

THE COUNCIL DESIRES TO EXPRESS ITS APPRECIATION TO DR. PAUL E. SABINE FOR THE PREPARATION OF THIS ARTICLE AND TO THE CONSULTANTS ON AUDIOMETERS AND HEARING AIDS FOR THEIR ASSISTANCE. THE CONSULTANTS ON AUDIOMETERS AND HEARING AIDS ARE DRS. C. C. BUNCH, GEORGE M. COATES, EDMUND P. FOWLER, ISAAC H. JONES, DOUGLAS MACFARLAN, C. STEWART NASH, HORACE NEWHART, BURT R. SHURLY AND WILLIAM P. WHERRY.

HOWARD A. CARTER, Secretary.

ACCEPTANCE TESTS OF HEARING AIDS

PAUL E. SABINE, PH.D.

GENEVA, ILL.

There are two questions which the prospective purchaser of a hearing aid wants answered. The first is "What type of instrument and what particular make of instrument will give me most nearly normal hearing?" This question settled, the second one is "Does the particular instrument which best meets my hearing needs have serious defects of a practical nature that would make its purchase inadvisable?"

The answer to the first question involves two factors: (a) the specific hearing defects which the hearing aid is designed to remedy and (b) the adaptability of the instrument to the correction of these defects. In the comparable case of defective vision the procedure is obvious. The patient first goes to a competent ophthalmologist, who employs established methods of measurement to determine the source and nature of the difficulty. He can then prescribe the curvature of the lenses that

will give the needed correction. This prescription is filled by a competent optician. The patient returns to the ophthalmologist, who by further measurements checks the finished lenses to insure that his prescription has been carried out. A corresponding procedure is the ideal to be attained in the case of defective hearing.

Unfortunately, the present state of both otologic testing and the art of producing hearing aids of prescribed characteristics leaves us far from this ideal. The development of the telephonic hearing aid using the carbon transmitter has come within the memory of living man, and only within the last ten years have manufacturers been able to achieve any measurable success in controlling the pitch characteristics of these instruments. The degree of sound amplification with wearable instruments of this type has been limited. The later type of aid embodying the vacuum tube principle of electrical amplification, together with the crystal type microphone and receiver, has come within recent years. Theoretically the pitch characteristics of this latest type of instrument are controllable, but consideration of size and the frequency response of both microphone and receiver impose serious limitations on this control.

The electrical hearing aid is a somewhat complicated piece of physical apparatus as contrasted with the simple lens for the correction of defective vision. Hence in order to come within the price range of the buying public it must be produced in quantities, as contrasted with the lenses which the optician grinds to individual order. Moreover, the manufacture of successful hearing aids calls for a vast deal of scientific investigation and technical development, which add to the cost of production in the present state of the art and accordingly to the price which the purchaser must pay. As a result, at present the electrical hearing aid is for the ordinary pocketbook an expensive piece of personal equipment and it meets with considerable sales resistance. This situation tends to produce high powered advertising and high pressure sales methods on the part of the manufacturers and distributors and presents a strong temptation for commercially exploiting the misfortune of the hard of hearing.

In this situation the medical profession and reputable manufacturers of hearing aids both recognize a responsibility to the user of hearing aids.

To meet this responsibility, the Council on Physical Therapy has appointed a group of consultants. The purpose of this group is to investigate as fully as possible, under the circumstances, hearing aids that are offered to the hard of hearing public. In this investigation no attempt is made to rate the merits of an instrument on any absolute basis or to evaluate the relative merits of different instruments, since the hearing improvement in any given case will depend on the type and degree of hearing impairment as much as on the characteristics of the instrument used. The precise results of any practical tests with hard of hearing subjects will also depend on these personal factors. On the other hand, the results of purely physical measurements will depend on the type and methods of measurements employed, and the interpretation of these results in terms of hearing improvement in any particular case is open to question.

It has therefore been the policy of the consultants to limit their investigations of instruments submitted by manufacturers to the directly ascertainable facts, such as the size, weight and shape of the various parts, the voltages and current drains of the batteries, and construction of the mechanical features and construction

of the instrument. Obvious electrical defects such as excessive internal noise and "feed back" causing the instrument to "squeal" under normal conditions of use are noted. Measurements are made to determine the frequency range over which the instrument shows appreciable sound intensity amplification. Articulation and intelligibility tests, using standard syllable and sentence lists spoken at conversational level at a distance of 5 feet in a quiet room, are made as a means of forming a qualitative judgment of the performance of the instrument under conditions of normal use. Consideration is given to all these factors by the consultants in forming a judgment as to the acceptability of each instrument submitted. At the same time, advertising matter is scrutinized for exaggerated statements, as well as for claims clearly beyond the demonstrable performance of the instrument.

The foregoing does not constitute an exhaustive investigation of the instrument. The consultants are of the opinion, however, that the data thus secured are sufficient to warrant a judgment as to whether the instrument in question can be properly designated as a "hearing aid," in the commonly accepted meaning of the term, in view of the present state of the art. The standard of acceptance has of necessity to be more or less relative. Every effort is made, however, to insure that it is not variable as between instruments that are now on the market. The consultants strongly urge that such figures as are given in their published report be not used as the basis for comparing the merits of different instruments, since the tests are not sufficiently exhaustive to warrant the use in this way of their quantitative results.

"Acceptance" of a hearing aid by the Council and consultants therefore does not carry with it any recommendation for its use in any specific case. It does not mean that all hard of hearing subjects will be benefited by its use. It does mean, however, that the "acceptable aid" has been examined by a competent and unbiased investigator, that it is well made and free from serious mechanical and electrical defects and that it produces sufficient amplification of sound intensity in the frequency range required for the understanding of speech so that it may be rated as a practical aid to hearing. Further, it means that the consultants have examined the advertising matter submitted and that it is free from extravagant and unwarranted claims for the instrument examined.

The first question of the prospective user of a hearing aid as to which of the various instruments that he may buy will most nearly meet his particular needs can best be answered by diagnosis by a competent otologist after careful audiometric tests. Such a diagnosis will answer the question as to whether the air receiver or the bone receiver instrument is likely to yield the better results but not necessarily which will be the more acceptable to the patient; it will also answer the question as to what portion of the frequency range appears to require the greatest amplification in order to supply best the patient's individual defects. The otologist is not in a position today to "fit" the patient's ears with the precision with which an ophthalmologist might "fit" his eyes, but much better results can be secured by friendly cooperation between the otologist and the hearing aid dealer than by the hit or miss method of trying everything in sight and buying on the basis of the most persuasive salesmanship.

Council on Pharmacy and Chemistry

PRELIMINARY REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING
PRELIMINARY REPORT. PAUL NICHOLAS LEECH, Secretary.

ACETYLGLYCARSENO BENZENE

(Sodium 3-4' diacetyl-amino-4-hydroxyarsenobenzene-2' glycolate)-Winthrop

PRELIMINARY REPORT OF THE COUNCIL ON PHARMACY AND CHEMISTRY

Acetylglycarsenobenzene (sodium 3-4' diacetyl-amino-4-hydroxyarsenobenzene-2' glycolate) was submitted for the Council's consideration as proposed for use in the treatment of syphilis. The Winthrop Chemical Company informed the Council that the product is not yet under commercial production pending completion of studies now being carried on. The firm also informed the Council that the product had been designated as "S. S. 371" during its investigational period and that it has been known abroad as "Solu-salvarsan." The firm at this time presented no proprietary name for the Council's consideration. It pointed out that the designation "Acetylglycarsenobenzene" has been recognized by the National Institute of Health.

It is a yellow, odorless powder, readily soluble in water, containing 28.30 per cent of arsenic.

Administered intramuscularly it is reported to be well tolerated by both animal and man and in albino rats to be tolerated systemically: 400 mg. per kilogram of body weight when given intravenously and 500 mg. per kilogram intramuscularly.

Its therapeutic index is reported to exceed 30. Excretion studies have shown that the peak of excretion in cats occurs in the first twenty-four hours and fecal by the third to fourth day. In dogs the urinary peak of excretion occurred on the second day and in three normal human beings who received at three day intervals two intramuscular injections of 175 mg. each of the products 21.5 per cent of the arsenic was excreted the first day, 31.7 per cent in three days and 34.8 per cent in fourteen days.

A clinical report of two years' study made by Guy, Goldmann, Gannon and Stone revealed that the product seemed to have reasonable therapeutic qualities but that its toxicity for man was high. In the discussion that followed it was shown that the combined material studies at the University of Pittsburgh, University of Maryland and the Johns Hopkins University Syphilis Clinics comprised some 235 cases in which twenty-eight severe reactions were noted, there being eighteen sensitization dermatitides, including several cases of dermatitis exfoliativa, three cases of icterus, three blood dyscrasias, one nephrosis and one hemorrhagic encephalitis with death.

An efficient painless arsenical that could be used intramuscularly in the treatment of syphilis would be of great value. Toxicologic and therapeutic tests of the drug under the name of Solu-salvarsan were made on behalf of the therapeutic trials committee of the Medical Research Council, reported by L. W. Harrison (*Brit. Ven. Dis.* 15:203 [July] 1939). These investigators found that it was not as effective as neoarsphenamine. Examination of tissue juices from primary lesions following an injection of the preparation showed that organisms might be found even as long as six days afterward. In some cases the intramuscular injections were quite painful and reactions following its use were far from rare, many of them being severe, even with resulting death.

The Council held that further perfection of this compound is necessary before it can be generally used in man. The Council expressed its approval of the conservative manner in which the Winthrop Chemical Company has studied this compound before even considering its commercial production. It appears that to each clinic which tried the drug the Winthrop Chemical Company explained that nothing would be done with the product

from a marketing standpoint before it had been found to be satisfactory not only from a therapeutic standpoint but also from the standpoint of low incidence of reactions. The Council voted to postpone consideration of Acetylglycarsenobenzene.

Council on Foods

ACCEPTED FOODS

THE FOLLOWING ADDITIONAL FOODS HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON FOODS OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO ACCEPTED FOODS.

FRANKLIN C. BING, Secretary.

CANNED AND DRIED FRUITS AND FRUIT PRODUCTS (See Accepted Foods, 1939, p. 70).

The Appella Corporation, Selah, Wash.

APPELLA APPLE CRISPS, dried granules of steamed, cored peeled apples.

Analysis (submitted by manufacturer).—Moisture 0.2%, total solids 99.8%, ash 2.0%, fat (ether extract) 2.1%, protein (N \times 6.25) 1.0%, crude fiber 4.5%, reducing sugars before inversion 52.0%, sucrose [(total reducing sugar after inversion minus reducing sugars) \times 0.95] 17.5%, pectin (alcohol precipitate) 9.6%, total carbohydrates other than crude fiber (by difference) 90.2%, total acidity (as malic acid) 2.7%, total sulfurous acid 0.01%, sodium (Na) 0.11%, potassium (K) 0.87%, calcium (Ca) 0.015%, magnesium (Mg) 0.029%, copper (Cu) 0.0008%, iron (Fe) 0.0125%, phosphorus (P) 0.0014%, chloride 0.216%, manganese (Mn) absent, total sulfur (S) 0.137%, silica (SiO₂) 0.005%, arsenic (As) 0.0008 grain per pound, lead (Pb) absent.

Calories.—3.8 per gram; 98 per ounce.

FRUIT JUICES INCLUDING TOMATO JUICE (See Accepted Foods, 1939, p. 48).

American Grape Juice Corporation, Fredonia, N. Y.

FREEDOM BRAND GRAPE JUICE UNSWEETENED, bottled pasteurized grape juice prepared from Concord grapes.

Analysis (submitted by manufacturer).—Moisture 82.6%, total solids 17.4%, ash 0.23%, alkalinity of ash (cc. N/10 Acid per 100 Gm.) 30.4 cc., acidity as tartaric acid 1.1%, protein (N \times 6.25) 0.3%, fat 0.13%, carbohydrate (by difference) 16.7%, sugar (before inversion as invert sugar) 14.4%, sugar (after inversion as invert sugar) 14.5%, sucrose negligible. Tests of lead and arsenic show that the product complies with Council requirements for freedom from toxic spray residues.

Calories.—0.7 per gram; 16 per ounce.

TAFT'S BRAND GRAPE JUICE UNSWEETENED, same as Freedom Brand Grape Juice Unsweetened.

PREPARATIONS USED IN THE FEEDING OF INFANTS (See Accepted Foods, 1939, p. 156).

Harold H. Clapp, Inc., Rochester, N. Y.

CLAPP'S CHOPPED PINEAPPLE RICE DESSERT WITH RAISINS, a canned cooked mixture of milk, pineapple, rice, sucrose, seedless raisins, sodium chloride and vanilla extract.

Analysis (submitted by manufacturer).—Moisture 77.5%, total solids 22.5%, ash 0.59%, fat (ether extract) 1.2%, protein (N \times 6.25) 2.4%, crude fiber 1.7%, carbohydrate other than crude fiber (by difference) 16.6%, calcium (Ca) 65.1 mg. per 100 Gm., phosphorus (P) 53.6 mg. per 100 Gm., iron (Fe) 2.2 mg. per 100 Gm., copper (Cu) 0.08 mg. per 100 Gm.

Calories.—0.87 per gram; 25 per ounce.

SUGARS AND SYRUPS (See Accepted Foods, 1939, p. 324).

Union Sugar Company, San Francisco.

UNION BRAND SUGAR, granulated beet sugar.

Analysis (submitted by manufacturer).—Moisture 0.03%, ash 0.01%, fat none, protein none, sucrose 99.9%, reducing sugars trace, crude fiber none, sulfites expressed as sulfur 3.0 parts per million.

Calories.—4 per gram; 114 per ounce.

UNCLASSIFIED AND MISCELLANEOUS FOODS, PEANUT BUTTER (See Accepted Foods, 1939, p. 381).

Good Foods, Inc., Minneapolis.

SKIPPY BRAND PEANUT BUTTER CREAMY STYLE, ground peanuts, the oil of which has been extracted, hydrogenated and then mixed with the peanuts, sugar and sodium chloride.

Analysis (submitted by manufacturer).—Moisture 0.4%, total solids 99.6%, ash 3.1%, fat (ether extract) 49.1%, protein (N \times 6.25) 30.8%, crude fiber 0.9%, carbohydrates other than crude fiber (by difference) 11.3%.

Calories.—6.3 per gram; 179 per ounce.

SKIPPY BRAND PEANUT BUTTER CHUNK STYLE, same as Skippy Brand Peanut Butter Creamy Style except that one-eighth inch particles of roasted peanuts have been added.

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SATURDAY, NOVEMBER 9, 1940

DEDICATION OF THE NATIONAL INSTITUTE OF HEALTH

On October 31 the new buildings of the National Institute of Health at Bethesda, Md., were dedicated at an occasion which marks a new epoch in the growth and development of the United States Public Health Service. The contribution of seventy acres of land by Mr. and Mrs. Luke I. Wilson, who wrote to the President in 1935 offering a portion of their estate for the benefit of scientific research, was the first step in this development. The creation of the National Cancer Institute by an act signed by the President, Aug. 5, 1937, was a second step. Now through cooperation of the Federal Works Agency, the Public Buildings Administration and the United States Public Health Service this new structure is added to our national facilities. From the small service laboratory building in 1890 with its meager facilities and infinitesimal support, this aspect of the work of the United States Public Health Service has grown to the great accomplishments of today with a great estate, magnificent buildings and opportunity for expansion. The contribution of the United States Public Health Service to our knowledge of yellow fever, Rocky Mountain spotted fever, pellagra, industrial diseases, tularemia, malaria, psittacosis and many other medical problems and its contributions in the standardization of serums, anti-toxins, vaccines and surgical sutures are recognized by every physician as fundamental to the high quality of medical service available in our country.

Noteworthy in the address on this occasion was the statement by President Franklin Delano Roosevelt. After recognition of the significance of medicine and public health in national defense, the President said:

We have recognized the strategic importance of health by the creation of a Health and Medical Committee in the Council of National Defense whose job it is to coordinate the health and medical aspects of national preparedness. This committee is assisting the government in the mobilization of the medical and health resources of the country to serve the best interests both of the military and the civilian elements of the nation.

He pointed out the need for cooperation from all the various phases and activities in the field of medicine and he continued:

Neither the American people nor their government intend to socialize medical practice any more than they plan to socialize industry. In American life the family doctor, the general practitioner, performs a service which we rely upon and trust.

No one has a greater appreciation than I of the skill and self sacrifice of the medical profession. And there can be no substitute for the personal relationship between doctor and patient which is a characteristic and a source of strength of medical practice in our land.

He paid a tribute to the high status of medical science in the United States and to the part played by the Public Health Service in this advancement. He concluded:

Today the need for the conservation of health and physical fitness is greater than at any time in the nation's history. In dedicating this institute, I dedicate it to the underlying philosophy of public health; to the conservation of life, to the wise use of the vital resources of our nation.

The medical profession of the United States congratulates the United States Public Health Service on this addition to the other great structures which it administers. The medical profession recognizes the necessity for an official agency of this type whose wise leadership may well be a constant stimulus to medical advancement and to cooperation among city, county and state agencies also concerned with public health problems.

SEROLOGIC TESTS FOR SYPHILIS AND SELECTIVE SERVICE

Last week THE JOURNAL pointed out that the new regulations regarding serologic examination for syphilis of men coming under the Selective Service Act were unique and not duplicated as far as we knew in any other country or by this country in any previous emergency. The editorial concluded with the statement that those who have syphilis with remedial manifestations would apparently be placed in Class 1-A, the group considered to be qualified for general military service. An exception, of course, would be made for those with cerebrospinal, cardiovascular or visceral syphilis. The statement concluded by saying that presumably the decision as to how much attention would be given to the presence of syphilis would rest with the military authorities after induction into the service. Coincident with the publication of this editorial, a telegram was sent to the Selective Service headquarters, inquiring as to whether or not men selected under Selective Service with two positive Wassermann tests would be classified for induction, deferred or rejected, provided they did not have cerebrospinal, cardiovascular or visceral syphilis. The telegram was considered necessary because of the apparent discrepancy that existed between the regulation that a Wassermann test should be given each man examined and that another test should be made provided the first test was positive. A reply was received some days later

from Mr. Dykstra, now Director of Selective Service; his telegram read:

No man with acute or chronic venereal disease will be used for military service. For administrative purposes Selective Service will consider two positive serological tests performed within three months to be evidence of latent syphilis and to be cause for rejection.

In *THE JOURNAL* last week the regulations regarding genito-urinary organs and venereal diseases, as published on page 1557, indicate that acute or chronic gonorrhea and syphilis with remedial manifestations, except cerebrospinal, cardiovascular or visceral syphilis, would involve placing the registrant in Class 1-A for general military service. The new telegram from Mr. Dykstra indicates that one positive Wassermann test would probably require that the registrant be deferred until a second test within three months, and that a second positive test within three months would involve rejection.

In this connection, attention is called to the article in this issue of *THE JOURNAL* by Moore, Eagle and Mohr, on page 1602, in which they report that they have seen at least forty examples of false positive tests for syphilis either in normal persons or in those with various diseases during the last two or three years. The recognition of false positive serologic tests is especially important in view of the decision to reject for military service registrants with two positive serologic tests for syphilis. A procedure suggested for differentiation of false positive from positive reactions actually due to syphilis appears on page 1604 of this issue.

EXPERIMENTAL HUMAN SCURVY

Physicians who serve as their own experimental animals for the elucidation of medical problems are not infrequent; they always arouse admiration and appreciation, however, even when martyrdom may not be involved. A recent example of such self experimentation is the production and thorough study of an induced case of human scurvy. The observations were made at Harvard University by Crandon, Lund and Dill;¹ the first named, an assistant in surgery at the Harvard Medical School, was the experimental subject. The diet was carefully prepared and was completely deficient in vitamin C but adequate in every other respect. Crandon spent a period of six months on this diet. While two other studies on experimental human scurvy are cited, one was not controlled and the other lasted for only a few days. This study is therefore the first in which a human being has remained on a controlled diet deficient only in vitamin C for this length of time.

During this experiment the plasma content of ascorbic acid fell to a low level within ten days and disappeared in thirty days; after 132 days on the vitamin C deficient diet the first abnormal objective clinical sign was

observed. In other words, the plasma ascorbic acid level was zero for thirteen weeks before the first clinical evidence of scurvy appeared. The vitamin C content of the white cell-platelet layer of centrifuged blood could be correlated much more directly with development of the disease; i. e., this value fell to zero shortly before the development of clinical scurvy. It would therefore seem that determination of the ascorbic acid level of the white cell-platelet layer of the centrifuged blood rather than of the plasma would constitute a more accurate laboratory method for the detection of incipient scurvy. Another early sign was the finding of interruption of the lamina dura in x-ray films of the teeth; however, objective dental manifestations were not observed and biopsy of the gingiva even at the end of the six month period was negative.

The earliest clinical manifestations of scurvy were hyperkeratotic papules, which were noted after 132 days on the vitamin C deficient diet; the perifollicular hemorrhages of scurvy required another month (161 days) for their appearance. There was also a noticeable fragmentation of hair. Associated with these signs was a pronounced dryness of the skin, particularly over the extensor surfaces. These manifestations suggested vitamin A deficiency, but biophotometric tests showed normal visual adaptation in the dark, thus excluding this possibility. Subjective weakness was first noted at the end of the third month and increased progressively. A rather thorough study of the fatigue was made in the Fatigue Laboratory of Harvard University. Although it was due to some underlying physiologic deficiency, an explanation was not found. The subject suffered a steady and progressive weight loss of 27 pounds (12 Kg.). The blood pressure also fell. Anemia, however, did not occur, although the plasma protein fell slightly. Incidentally the subject, though previously susceptible to mild attacks of coryza, enjoyed complete freedom from respiratory infections, though the experimental period lasted through the winter months from October to May.

Wound healing was carefully studied by means of biopsies of previously inflicted wounds in the skin and fascia. The first observation was made three months after the start of the experiment; at this time normal wound healing occurred, although the plasma ascorbic acid level had been zero for forty-four days. The second test was made at the end of 182 days after the blood level of ascorbic acid had been zero for 141 days and forty days after the first clinical manifestation of scurvy. Definite failure of healing was noted at this time. Beneath the surface of the skin, which appeared well healed, was an unorganized blood clot. Microscopically the tissue showed a lack of intracellular substance and capillary formation. Parenteral vitamin C alone brought about good healing, and considerable intracellular substance appeared within ten days.

The disappearance of all signs and symptoms of scurvy was rapid following the intravenous injection

1. Crandon, J. H.; Lund, C. C., and Dill, D. B.: Experimental Human Scurvy, *New England J. Med.* 223: 353 (Sept. 5) 1940.

of ascorbic acid. Saturation curves were determined each day for several days and proved most illuminating; after the first injection of 1 Gm. of the vitamin, i. e. when deficiency was complete, the plasma ascorbic acid level fell to almost zero in three hours. On the next day the same dose was injected but this time the level fell only to 0.25 mg. per hundred cubic centimeters in five hours. On the third day the same dose was injected but the level fell only to 0.75 mg. per hundred cubic centimeters even after seven hours following the injection. On the fourth day the level remained well above 1 mg. per hundred cubic centimeters, which is normal. In other words, the blood became completely saturated after 4 Gm. of the vitamin had been given intravenously, 1 Gm. on each of four successive days. Urinary excretion studies, however, indicated that the tissues were still not completely saturated at this time. These clearcut observations have obvious diagnostic as well as therapeutic implications. For example, the authors have calculated the approximate human requirement of the vitamin as lying between 30 and 45 mg. a day. This was determined by dividing the 4 to 6 Gm. needed to saturate the subject by 132 days, the period of total deprivation required to produce clinical scurvy.

Here then for the first time is a completely observed case of human scurvy under careful clinical, metabolic, chemical and dietetic control. The information should be widely studied; it enables the clinician to picture accurately the entire natural history of scurvy in one person. Analysis of the data will also resolve many disputed points which have resulted from uncontrolled observations. No doubt the experimental subject, when he returned to his regular diet, showed no deleterious effects of his experiences.

TWO PERIODICALS CELEBRATE ANNIVERSARIES

With its cover in a silver tone appears the first number of volume 26 of the *Journal of Laboratory and Clinical Medicine*. Its first editor was Dr. Victor C. Vaughan, and one member of its editorial board, Dr. Dennis E. Jackson, has served throughout the entire twenty-five years of its existence. The present editor is Dr. Warren T. Vaughan of Richmond, Va., a son of the first editor. In the twenty-five years that have passed since the first appearance of this publication, clinical pathology has developed a more distinguished status; indeed, for some the laboratory has achieved a position that is well nigh supreme in medical practice. However, the clinical aspects of medicine continue to be so vital that the maintenance of this periodical as a journal of both laboratory and clinical medicine is indicative of the manner in which the laboratory must continue to be the handmaiden of clinical practice. As Dr. Kilduffe says, however, in the concluding article of this issue, "Unless men of proper caliber can be

induced to enter the field of clinical pathology . . . medicine in general will suffer, and hospitals . . . will be increasingly unable to fulfil the function and the destiny which are properly theirs."

The *American Journal of Obstetrics and Gynecology* celebrates now its twentieth anniversary. It continues to be the official organ of most of the important societies of specialists in the fields which it covers. Edited since its beginning by Drs. George W. Kosmak, its founder, and Hugo Ehrenfest, this publication has fulfilled its purpose adequately since its establishment. Indeed, a census of obstetricians and gynecologists made a few years ago as to whether there was need for any further publication to reflect advancement in this field yielded a response insufficient to stimulate the initiation of such a publication.

For many years the American Medical Association, through its House of Delegates, has urged that periodicals in the field of medical science confine their advertisements for pharmaceutical products, foods and physical apparatus to materials and preparations, which have been passed on by the official councils of the Association. The primary purpose of these councils is to improve standards in the fields concerned, so that science rather than credulity controls medical prescribing for patients. Unfortunately, the obstetric journal which now celebrates its anniversary, and which has succeeded through the efforts of many distinguished physicians, has never limited its advertising to such standards. It has become apparently a medium for the promotion of products incapable of meeting these standards. Thus the current issue of the obstetric publication has some twenty-five of its advertising pages devoted to unacceptable products; these advertisements constitute more than half of all the advertising. Presumably the editors have little or no responsibility for or influence on the advertising standards.

Current Comment

MEDICINE ORGANIZES FOR THE EMERGENCY

Elsewhere in this issue appears a statement from the Committee on Information of the Division of Medical Sciences of the National Research Council describing the organization of various committees and subcommittees of that division to deal with medical problems associated with the military and naval services. These agencies were developed following a request from the United States Army and Navy Medical Corps for assistance in standardization of certain medical phases of their work. Gradually some form is beginning to develop in relationship to the organization of medical service in the emergency. Apparently the Health and Medical Committee in the Council of National Defense will have the responsibility for coordinating all the various agencies which have been established. To the Committee on Medical Preparedness of the American

Medical Association has been assigned advice in the development of such personnel as may be required. The Division of Medical Sciences of the National Research Council through its appropriate committees and subcommittees is charged with advice on standardization of medical procedures. There are innumerable agencies of the federal government which are concerned with certain aspects of medicine and the care of the public health. Apparently their coordination will rest to some extent on Miss Harriet Elliott, who is a member of the Advisory Commission on National Defense and who represents the consumer. She has appointed subcommittees which have been described in previous items in *THE JOURNAL*. These subcommittees are concerned with some of the health and medical problems of consumers throughout the United States. Medicine's representative on her committees is Dr. Thomas Parran of the United States Public Health Service. He is also a member of the Health and Medical Committee of the Council of National Defense. The representative of the American Medical Association and the Committee on Medical Preparedness on the Medical Committee of the Council of National Defense is Dr. Irvin Abell, and for the Division of Medical Sciences of the National Research Council it is Dr. Lewis H. Weed. These, with the Surgeon Generals of the government services, constitute the Health and Medical Committee. It should be possible with this arrangement of committees to meet any needs which may arise for personnel, for scientific medical advice or for dissemination of information to the people in the field of health and medical care. By proper cooperation between the various agencies that have been established, disorder and confusion should be avoided. *THE JOURNAL* hopes in a future issue to present a diagram illustrating the various bodies now established, their relationships to one another and the proper lines of communication for the effective handling of problems which may arise in the emergency.

NONPLUSING "VITAMINS PLUS"

For years *THE JOURNAL*, the Council on Pharmacy and Chemistry and the Council on Foods and Nutrition have protested the irrational and uneconomical administration of mixtures of vitamins. Some of these combinations include A, B, C, D, E, G and even K mixtures; for good measure some firms add minerals. Cultist practitioners, even though trained only in manipulative technics, prescribe great quantities of these pellets. The public has been deluged with appeals to use these unscientific mixtures for everything from acne and colds to heart disease and xerophthalmia. One of the most widely promoted mixtures is "Vitamins Plus." Its advertisements feature the silhouette of a damsel, somewhat scantily attired, in terpsichorean poise. Under date of October 23 the Federal Trade Commission released the following stipulation concerning this mixture:

Vitamins Plus, Incorporated, 370 Lexington Avenue, New York, has entered into a stipulation with the Federal Trade

Commission in which it agrees to cease certain representations in the sale of a vitamin concentrate supplement designated "Vitamins Plus."

The respondent agrees to cease representing, directly or by implication, that cloudy or lusterless eyes or lack of whiteness of the teeth are generally due to Vitamin A deficiency; that vitamins are of significance in determining the duration of time hair stays in curl, or make-up remains on the skin surface, or nail polish adheres to the nails; that Vitamin B will maintain or nourish brain tissue, or will remove lactic acid from the blood stream and thereby eliminate fatigue, or is of value in cases of constipation or nervous disorders, except where and to the extent that such cases may be due to insufficient vitamin B; or that foods customarily consumed have but a negligible amount of Vitamin B.

Other representations which the respondent agrees to discontinue are that Vitamin E is known to be capable of preventing sterility or promoting mental or physical vigor; that by use of "Vitamins Plus" a person may expect to have sparkling eyes, or gleaming or lustrous hair, or a lovely complexion, or that one may become active, gay, beautiful or charming, or live without a "let-up" or "let-down."

Thus departs the glamour from Vitamins Plus; the bizarre claims will be no more; no doubt the thin girl may still waft herself across the page. The action of the Federal Trade Commission should be a salutary warning to the numerous imitators who have followed this trail toward entrancement of the gullible public. More than 200 vitamin products were pictured recently in an advertisement by a Chicago department store. Such promotion serves eventually to destroy well warranted public confidence in the real values of vitamins. Unscientific claims for hodge podge vitamin mixtures, supplemented with minerals as in Vitamins Plus, may well lead the public to the belief that vitamins are bunk.

PAN AMERICAN CONGRESS OF OPHTHALMOLOGY

The American Academy of Ophthalmology and Otolaryngology, in connection with its annual session in Cleveland in October, held the first Pan American Congress of Ophthalmology. For the Pan American Congress 219 physicians registered, of whom eighteen were Latin Americans from Central or South America. One Canadian was present. The remainder were ophthalmologists from the United States. The majority of the delegates from the Central and South American countries came from Cuba, Brazil and Puerto Rico. The congress will be administered by a council consisting of twenty-one representatives from each of the twenty-one American republics and it is planned that this congress will meet every three years. The likelihood is that the next meeting will be held in Montevideo, Uruguay. The president of the congress is Dr. Harry S. Gradle of Chicago. A special program was arranged for this congress, with alternate pages in English and Spanish, providing also abstracts of each of the papers presented. This would seem to be an excellent beginning toward the establishment of good scientific relationships between all the American nations. No doubt, as interest in such projects continues to grow the attendance from the South American countries may be expected to be much more representative.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

THE NATIONAL RESEARCH COUNCIL AND MEDICAL PREPAREDNESS

Actively functioning in medical preparedness is the National Research Council with its Division of Medical Sciences. In these undertakings the Research Council and its parent body, the National Academy of Sciences, are fulfilling one of their primary obligations as quasigovernmental institutions. The National Academy of Sciences was established by President Lincoln in 1863, under a charter from Congress which provided that the Academy should, whenever called on, give advice to the government on "any subject of science or art." During the Civil War, committees of the Academy dealt with military and naval problems.

In 1916, when there was threat of involvement of this country in the World War, the Academy again offered its services for national defense. At that time, in order to provide effective organization, the Academy, at the request of President Wilson, created the National Research Council as its active agent in organizing the scientific resources of the country. During the war the National Research Council served as the Department of Science and Research of the Council of National Defense and also as the Science and Research Division of the U. S. Signal Corps. Even in the midst of these war enterprises it became evident that the Council might serve an important function in peacetime. Accordingly, on May 11, 1918, President Wilson issued an executive order requesting the National Academy of Sciences to perpetuate the National Research Council and outlining its duties. In addition to problems of defense it was to survey and stimulate research in the various sciences. The latter function has been its principal aim during the succeeding years.

The National Research Council itself is composed of nine major divisions, of which the Division of Medical Sciences is one. These divisions are arranged in two groups, one comprising the main branches of science and the other foreign relations and educational relations. Each division, then, has a governing body consisting of representatives from the leading national scientific societies in that field and also certain members at large. The National Research Council thus constitutes a democratic organization, acting for the great body of scientific men of the United States.

MEMBERSHIP OF DIVISION OF MEDICAL SCIENCES

The problems of medicine are dealt with almost entirely by the Division of Medical Sciences but there is close cooperation with the other branches of science. The following national societies are members of the division:

- American Academy of Tropical Medicine
- American Association of Anatomists
- American Association of Pathologists and Bacteriologists
- American Dental Association
- American Medical Association
- American Neurological Association
- American Physiological Society
- American Psychiatric Association
- American Roentgen Ray Society
- American Society of Biological Chemists
- American Society for Clinical Investigation
- American Society for Experimental Pathology
- American Society for Pharmacology and Experimental Therapeutics
- American Surgical Association
- American Veterinary Medical Association
- Association of American Physicians
- Society of American Bacteriologists

CONTRIBUTION IN PRESENT EMERGENCY

At the annual meeting of the Division of Medical Sciences on April 26, 1940, the chairman, Dr. Lewis H. Weed, spoke of the problems of defense and offered the cooperation of the division to the representatives of the Army and Navy Medical Corps who were present at the meeting. About the middle of May, requests reached the chairman of the division from the Surgeon Generals of the Army and Navy asking that the division establish committees which should act in an advisory capacity to the two medical corps. As two problems were initially presented, (1) the use of chemotherapeutic agents in war casualties and mobilized forces and (2) the use of whole blood in individuals suffering from shock, two committees were initially named, on Chemotherapeutic and Other Agents and on Transfusions. These committees met a few days later and organized for the study of their specific problems. The details of their activities will be given later.

At these early meetings, so many problems relating to other branches of medicine and pertinent to military affairs were presented that it was quickly realized by the committee members and by the medical officers that it would be necessary to create additional committees covering the whole field of medicine. It was felt desirable that the general committees should function largely through subcommittees composed of the technical experts in their particular segments of medical knowledge. Overlap between the committees' interests was considered inevitable and probably advantageous; in consequence, several of the technical subcommittees were related to two of the main committees. General committees on Medicine and Surgery were appointed with subcommittees covering most of the special aspects of medical practice and research.

The membership of the committees and subcommittees represents the various groups and particularly the special societies devoted to these fields. The Surgeon Generals of the Army, Navy and Public Health Service have delegated representatives to attend the meetings of the committees in order to present problems and to give technical advice. In addition to the appointed members and the service representatives, special consultants have been called when problems in their field are presented.

Almost all of these committees have met a number of times and a great variety of problems has been discussed; many recommendations have been adopted. The representatives of the services present the problems on which they desire advice, and the whole question is carefully and broadly analyzed in open discussion. If the committee feels that recommendations can be made immediately, these are drawn up and forwarded to the interested services. In many cases, however, there is need for further study and such problems are then assigned to certain individuals of the committees, who later report back at the next meeting.

It is felt that the general function of these advisory committees of the National Research Council is to give professional advice to the services and to plan and administer research projects essential to the national defense. It happens that some committees by the nature of their interests have confined themselves almost entirely to professional advice while other committees are concerned largely with problems for which there is no immediate answer and which require investigation to supply the information needed.

STANDARDS OF PHYSICAL EXAMINATION

One example of the type of advice given to the Army is that relating to the regulation on "Standards of Physical Examination During Mobilization." The Army desired the latest knowl-

edge for this regulation and asked the Committee on Medicine for advice. The tentative manuscript was circulated among the members of the Committee on Medicine and then the sections on various specialties were brought up for discussion by the special groups, as for instance the Subcommittees on Tuberculosis, Cardiovascular Diseases, Diseases of Metabolism and Medical Nutrition. The recommendations thus presented were at once adopted by the War Department as far as they were practicable.

DEVELOPMENT OF PERSONNEL

In the last war it was found that there was great difficulty in assigning physicians to their proper place in the services, since sufficient information was not available as to their capabilities and experience. To obviate this difficulty the committees of the National Research Council are working in close cooperation with the Committee on Medical Preparedness of the American Medical Association in assembling all data on those medical men who will either volunteer or who will be called, so that each man will be placed most effectively.

EDUCATIONAL PROBLEMS

The exigencies and special problems of military organization require that the medical man brought into the service from civilian practice be given special training. This problem has been considered by a number of the committees. It is hoped that the medical schools and hospitals throughout the country will give this type of training in short courses to those doctors already brought into the services and also to those who expect to be called.

In order that the latest knowledge may be available to the medical officers, the Army Medical Corps requested that the subcommittees prepare manuals on their specialties. The Surgeon General's Office will soon issue a general manual which will cover the first aid treatment of war injuries, the treatment of medical emergencies and the chemotherapeutic treatment of infectious and venereal diseases. The sections for this have been prepared by the subcommittees. Many of the committees have been preparing material for larger technical manuals dealing with the operative procedure of war injuries and the like. Final arrangements for the publication of these have not yet been made.

COMMITTEES

Chemotherapeutic and Other Agents:

Perrin H. Long, Chairman	J. F. Mahoney
Francis G. Blake	E. K. Marshall Jr.
John S. Lockwood	

At its meeting on May 28, 1940, the committee divided its tasks under the following four subcommittees: Infectious Diseases, Venereal Diseases, Tropical Diseases and Surgical Infections.

The Subcommittee on Infectious Diseases:

Francis G. Blake,	Chester S. Keefer
Chairman	Stuart Mudd
Rolla E. Dyer	Thomas M. Rivers
Henry Helmholz	

This committee is studying problems of prevention and treatment and has already made certain recommendations. It has set up consultant groups for research on epidemics of influenza, pneumonia, encephalitis and poliomyelitis, meningococcic and hemolytic streptococcus infections, measles, and typhus, to be called when desired by the services.

The Subcommittee on Venereal Diseases:

J. Earle Moore, Chairman	Oscar F. Cox Jr.
Edwin P. Alyea	J. F. Mahoney
Charles W. Clarke	John H. Stokes

Eight meetings have been held. The committee has prepared memorandums on the prophylaxis and treatment of all the venereal diseases, utilizing the latest chemotherapeutic agents. It has made suggestions as to venereal disease control, for a standard nomenclature for the diagnosis of syphilis and, along with many of the other subcommittees, has outlined plans for the training of medical officers.

The Subcommittee on Tropical Diseases:

Wilbur A. Sawyer,	Thomas T. Mackie
Chairman	Henry E. Meleney
Mark F. Boyd	Robert B. Watson
Edward H. Hume	

Recommendations on the prevention and treatment of these diseases have been prepared. Arrangements have been made for the manufacture of yellow fever vaccine, at present by the Rockefeller Foundation and eventually by the government. The committee is studying the problem of malaria prophylaxis.

The Subcommittee on Surgical Infections:

Frank L. Meleney,	Perrin H. Long
Chairman	Champ Lyons
John S. Lockwood	

As its chief function at present the committee is organizing a research project on the prevention of wound infection and the treatment of burns. It is planned to study the efficacy of the sulfonamide compounds in civilian accident injuries and thus to arrive at a more rational treatment of war injuries to supplement the present technic of débridement.

The main Committee on Chemotherapeutic and Other Agents assembles the recommendations of its subcommittees and reviews the technical aspects. It also has prepared a list of trained experts in chemotherapy.

The Committee on Transfusions:

Walter B. Cannon,	E. D. Plass
Chairman	Max M. Strumia
Alfred Blalock	Cyrus C. Sturgis

On May 31, 1940, this committee held its first meeting. After prolonged discussion of the general problem as presented by the officers of the Army and Navy Medical Corps it decided to organize two Subcommittees on Blood Substitutes and on Shock.

The Subcommittee on Blood Substitutes:

Cyrus C. Sturgis,	O. H. Robertson
Chairman	John Scudder
Elmer L. DeGowin	Max M. Strumia
E. D. Plass	Owen H. Wengenstein

This group is primarily concerned with the study of the relative merits of whole blood, serum, and of wet and dry plasma in transfusion. Methods of preparation, transportation and administration are being considered and projects covering all of these aspects have been set up.

The Subcommittee on Shock:

Alfred Blalock, Chairman	Paul D. Lamson
Philip Bard	Frank C. Mann
Henry K. U. Beecher	D. B. Phemister
Norman E. Freeman	

Here fundamental investigation was thought essential. Some twenty-five projects dealing with all aspects of this subject have been proposed and a number of these are already under way. The committee has assembled material for a manual.

The Committee on Medicine:

Russell M. Wilder,	Warfield T. Longcope
Chairman	Hugh Morgan
Arthur L. Bloomfield	W. W. Palmer
James D. Bruce	James E. Paullin
Roger I. Lee	O. H. P. Pepper

This committee has the following Subcommittees:

Cardiovascular Diseases:

Paul D. White, Chairman	Ashton Graybiel
Edgar vanNuys Allen	Robert L. Levy
E. Cowles Andrus	William D. Stroud

Tuberculosis:

Esmond R. Long,	Herbert R. Edwards
Chairman	Paul P. McCain
James B. Amberson Jr.	James J. Waring
Bruce H. Douglas	

Metabolism:

J. H. Means, Chairman	John H. Talbott
Louis H. Newburgh	George W. Thorn
Elmer L. Sevringhaus	

Medical Nutrition:

Russell M. Wilder, Chairman	J. S. McLester
Paul E. Howe	Tom Spies
Norman Jolliffe	V. P. Sydenstricker
	Dwight Wilbur

Clinical Investigation:

David P. Barr, Chairman
(Eugene F. Du Bois was chairman until October, when he became chairman of the Committee on Aviation Medicine)

Detley W. Bronk	A. C. Ivy
David B. Dill	Irvine H. Page
George A. Harrop	Maurice C. Visscher

Therapeutics:

O. H. P. Pepper, Chairman	Maurice C. Pincoffs
Hugh Morgan	William B. Porter

In addition, the Subcommittees on Infectious Diseases, Tropical Diseases and Venereal Diseases, whose members have been given, are also related to the Committee on Medicine.

Besides reviewing the work of its subcommittees, the main Committee on Medicine has been making a survey of laboratory procedures for military hospitals and has given advice on the Mobilization Regulations. The latter has been the principal work to date of the Subcommittees on Cardiovascular Diseases, Tuberculosis and Metabolism, although they have frequently consulted with other committees on common problems.

The Subcommittee on Medical Nutrition has been dealing with the general phases of the subject, particularly as they relate to Army and Navy rations. Certain questions have been presented by the Quartermaster Corps of the Army and the Supply Corps of the Navy concerning the sufficiency of vitamins in rations, and already a number of the subcommittee's recommendations have been adopted. The nutritional needs of the whole population have been discussed and recommendations made for the restoration of vitamins to flour.

The Subcommittee on Clinical Investigation has served as a clearing house for problems requiring physiologic and medical research, routing some to appropriate committees and assigning those of a more general nature to various laboratories under the sponsorship of committee members. So far, some forty problems have been submitted. Reports on these have been made and arrangements outlined for carrying out the investigations. Among the subjects under consideration are fatigue, pressure studies, night blindness and dark adaptation, clothing for high and low temperatures, and gas poisoning.

The Subcommittee on Therapeutics has prepared a section on medical emergencies for the general manual and is making a survey of the drugs in the Army and Navy chests.

The Committee on Surgery:

Evarts A. Graham, Chairman	Robert H. Ivy
Irvin Abell	Herman L. Kretschmer
Donald C. Balfour	Charles G. Mixer
George E. Bennett	Howard G. Naffziger
Warren H. Cole	Alton Ochsner
Frederick A. Collier	I. S. Ravdin

has, as subcommittees:

Subcommittee on Anesthesia:

Ralph M. Waters, Chairman	John S. Lundy
Lewis S. Booth	Emery A. Rovenstine
	Ralph M. Tovell

Subcommittee on Radiology:

A. C. Christie, Chairman	Byrl R. Kirklin
William E. Chamberlain	Ursus V. Portmann

Subcommittee on Wound Healing:

Allen O. Whipple, Chairman

The surgical specialties are organized under a coordinating committee composed of the chairmen of the respective committees under the general chairmanship of Frederick A. Collier. This

committee correlates the activities of the other groups and one of its chief tasks is the evaluation of specialist personnel. At present the subcommittees are concerned largely with problems of training and with the preparation of material for manuals.

The subcommittees on the surgical specialties are:

Subcommittee on Neurosurgery:

* Howard G. Naffziger, Chairman	Howard W. Fleming
Alfred W. Adson	* Gilbert Horrax
Charles Bagley Jr.	* Max M. Peet
* Percival Bailey	Cobb Pilcher
Claude C. Coleman	* Tracy J. Putnam
Loyal Davis	Byron P. Stookey

Subcommittee on Faciomaxillary and Plastic Surgery:

Robert H. Ivy, Chairman	P. C. Lowery
John S. Davis	Ferris Smith
Joseph D. Eby	

Subcommittee on Otolaryngology:

Harris P. Mosher, Chairman	V. H. Kazanjian
George M. Coates	Samuel J. Kopetzky
Ralph A. Fenton	Harold I. Lillie
William E. Grove	John J. Shea
Frederick T. Hill	Burt R. Shurley
Charles J. Imperatori	William P. Wherry

Subcommittee on Vascular Injuries:

John Homans, Chairman	Daniel C. Elkin
Arthur W. Allen	Walter G. Maddock
Geza de Takats	

Subcommittee on Thoracic Surgery:

Evarts A. Graham, Chairman	Edward D. Churchill
Isaac A. Bigger	Leo Eloesser

Subcommittee on Orthopedic Surgery:

George E. Bennett, Chairman	J. Albert Key
LeRoy C. Abbott	Frederick C. Kidner
Harold Conn	Guy Leadbetter
William Darrach	Paul B. Magnuson
Robert H. Kennedy	M. N. Smith-Petersen
	Philip D. Wilson

Subcommittee on Physical Therapy:

John S. Coulter, Chairman	Frank M. Krusen
Frank H. Ewerhardt	Walter J. Zeiter
Kristian G. Hansson	

Subcommittee on Urology:

Herman L. Kretschmer, Chairman	Frank Hinman
William Braasch	Oswald S. Lowsley
Homer G. Hamer	Albert J. Scholl

Subcommittee on Ophthalmology:

Harry S. Gradle, Chairman	Peter C. Kronfeld
William L. Benedict	Lawrence T. Post
Sanford R. Gifford	

The Subcommittees on Shock and on Surgical Infections also are related to the general Committee on Surgery.

Committee on Information:

Morris Fishbein, Chairman	Ira V. Hiscock
J. J. Bloomfield	Sanford V. Larkey
John F. Fulton	Robert N. Nye
Richard M. Hewitt	

To this committee was delegated the assembling and dissemination of information concerning war medicine and the work of the committees and of other organizations. The committee will give general advice on the editing of manuals, bulletins and other publications. Its Subcommittee on Publicity:

Morris Fishbein, Chairman	William L. Laurence
Watson Davis	Arthur T. Robb
David Dietz	

will prepare press releases.

* Acting committee, and chairmen of special committees.

The Subcommittee on Historical Records:

John F. Fulton, Chairman	George Stewart
E. H. Cushing	Henry R. Viets
Archibald MacLeish	

This group will assemble all the documentary materials relating to this emergency and eventually it will aid in compiling its history. Another subcommittee, that on Correlation of Information, Sanford V. Larkey, Chairman, attends to the distribution of the various communications from the committees, indexes the minutes and other publications and in general acts as liaison between all of the committees. In order to facilitate its work, the subcommittee has established an office in Washington in the National Academy-Research Council building.

Committee on Aviation Medicine:

Eugene F. Du Bois,	John F. Fulton
Chairman	Eugene M. Landis
Cecil K. Drinker	Walter R. Miles

This group has been organized at the request of the Health and Medical Committee of the Council of National Defense. This committee will take over the problems on aviation medicine, some of which had already been considered by other subcommittees.

One other general committee is in process of organization, that on Neuropsychiatry:

Winfred Overholser,	Adolf Meyer
Chairman	Tracy J. Putnam
Franklin Ebaugh	Harry Steckel
Foster Kennedy	John C. Whitehorn

This committee was also formed at the request of the Health and Medical Committee.

The chairmen of the seven main committees constitute an executive committee, under the chairmanship of Dr. Lewis H. Weed, representing the Division of Medical Sciences. Its province is largely confined to policy and budgetary matters and except in rare instances, it will not pass on scientific or technical recommendations.

On Sept. 19, 1940, the Council of National Defense established the Health and Medical Committee. "It will be the responsibility of the Committee to advise the Council of National Defense regarding the health and medical aspects of National Defense and to coordinate health and medical activities affecting National Defense." The National Research Council, as a quasi-governmental agency, is represented on this committee, through the chairman of the Division of Medical Sciences, Dr. Lewis H. Weed; and the work of its committees and subcommittees are, therefore, integrated into the whole endeavor. To the committees of the National Research Council will fall the problems of special professional advice and research, while other more general aspects will be dealt with by committees set up directly under the Health and Medical Committee.

WAR DEPARTMENT NEEDS MEDICAL TECHNICIANS

Medical technicians experienced in surgical and x-ray work are needed by the War Department. The United States Civil Service Commission has announced an examination to fill these positions in the following grades and optional subjects: senior medical technician (roentgenology) \$2,000 a year, medical technician (roentgenology and surgical) \$1,800 a year, assistant medical technician (roentgenology and surgical) \$1,620 a year. The salaries are subject to a retirement deduction of 3.5 per cent.

Applications must be on file with the commission's Washington office not later than November 28 if received from states east of Colorado and not later than December 1 if received from Colorado and states westward.

Applicants must have completed a four-year high school course unless they pass a written general test and, in addition, they must have had responsible experience

in surgical duties in an operating room or clinic, or in x-ray work including x-ray photography and posturing, and in the installation and maintenance of x-ray apparatus. Appropriate college study may be substituted for part of the required experience. With the exception of those who have not completed the high school course, applicants will not be given a written test. All competitors will be rated on their qualifications as shown in their applications and on corroborative evidence.

Information regarding the examinations and the application forms may be obtained from the Secretary of the U. S. Civil Service Examiners at any first or second class post office or from the United States Civil Service Commission, Washington, D. C.

MILITARY HOSPITAL AT LOUISIANA STATE UNIVERSITY

A military general hospital will be organized at Louisiana State University Medical Center in compliance with a request from the Office of the Surgeon General, U. S. Army, Washington, D. C., under the direction of Dr. Urban Maes, professor of surgery at the school. These units are organized by the war department in peace time as regular army inactive units required for mobilization in the event of a national emergency. The object is to provide through affiliation with selected civil institutions integrated hospital units with qualified, coordinated personnel prepared for early active military duty as may be required.

MILITARY APPOINTMENT AT UNIVERSITY

Major Ira F. Peak, U. S. Army, retired, former clinical director of Pinebluff Sanitarium, Pinebluff, N. C., has been assigned as instructor of military science and tactics at Indiana University School of Medicine, Indianapolis. He succeeds Col. Wilson C. Von Kessler, who was transferred to San Francisco as commanding officer of the medical regiment at Camp Ord.

DR. KOPETZKY HEADS DRAFT BOARD PHYSICIANS IN NEW YORK

Dr. Samuel J. Kopetzky has been appointed chief medical officer of the draft boards of New York City, it was announced October 19. Physicians to serve the 280 draft boards in the city were announced at the same time. Names of these physicians were taken from a list recommended by Dr. Kopetzky, as were members of advisory boards that will serve every twenty or so local boards to check the conclusions of the medical officers in cases in which a specialist's advice is needed.

SOUTH CAROLINA PREPAREDNESS COMMITTEES MEET

A conference of state and county committees on medical preparedness of the South Carolina Medical Association was held in Columbia, October 14. Dr. Edgar A. Hines, Seneca, state chairman, reported the conference on medical preparedness held at the headquarters of the American Medical Association, September 20, and Dr. Edgar Hill Greene, Atlanta, state chairman for Georgia, made an address on medical preparedness.

ORGANIZATION SECTION

CALIFORNIA PHYSICIANS' SERVICE

The organization of California Physicians' Service is the outgrowth of several years of study, experiment, attempted legislation and a multitude of proposed plans. The preliminary work included a much discussed study of medical conditions in California for which the California Medical Association expended about \$50,000. It also includes a great amount of public controversy before legislative committees, in nearly all California periodicals and in the 1939 California legislature of a plan, which received the energetic support of the current administration, for compulsory sickness insurance. There have been more private prepayment plans and so-called insurance schemes in California than in most other states, some of which were shown to be gross frauds on the public and which subjected their originators and managers to criminal prosecution and conviction. For several years the sessions of the House of Delegates of the California Medical Association have devoted much of their time to discussions of proposals for plans for the prepayment of medical service. The present plan would seem to have been preceded by ample investigation and consideration.

The plan as finally adopted was in the form of a nonprofit corporation based on three classes of members: administrative, professional and beneficiary. There are seventy-five administrative members, the majority of whom are members of the California Medical Association but include a number of non-medical members who have been elected by not less than two thirds of the administrative members who represent districts. The administrative members elect the board of trustees of the plan and are responsible for most of the administrative features of the plan.

PROFESSIONAL MEMBERSHIP

Professional members include any person licensed to practice medicine under the laws of the state of California who carries malpractice insurance and who signs an application blank agreeing to serve under the rules and by-laws and pays a \$5 registration fee. According to the latest reports 5,200 California physicians have enrolled under the plan. The 1940 American Medical Directory lists 11,909 licensed physicians in the state, of whom about 9,000 are in active private practice. The money obtained from registration fees constitutes a part of the working capital of the service. The California Medical Association lent the service \$15,000 when it started to meet initial organization expenses and later made additional loans totaling \$27,000.

The service was incorporated on Jan. 2, 1939, and began actual operation about July 1, 1939. The administrative members elected a board of nine trustees, including eight physicians and one layman, who receive no salary. The board of trustees elected a medical director, who must be a physician not engaged in private practice. The state is divided into twenty-one districts, each having an assistant medical director operating under the supervision of the general medical director. These medical directors are not to supervise medical care but only to safeguard the use of money from the fund in order that it may furnish adequate service to

beneficiary members. Certain medical procedures and operations require the approval of the assistant medical director before they can be undertaken. Each professional member is required to carry malpractice insurance, and clauses in the contracts with the beneficiary members who are to receive the service exempt California Physicians' Service from any legal liability in connection with the professional services rendered.

BENEFICIARY MEMBERSHIP

The beneficiary members are the prospective patients. These must be under 65 years of age and belong to families with incomes of not more than \$3,000 annually. There has been considerable discussion as to the income limit, and persons with more than \$3,000 annual income are admitted with a provision that the physician will be permitted to make a special charge for services in addition to that provided for in the fee schedule. In order to insure a fair selection, the plan provides that members will be accepted for service only in groups of five or more, such groups being already in existence, generally as employees of a single industry. In small groups, eleven and under, 100 per cent participation is required, and in larger groups at least 50 per cent must enroll. Proposals are also under consideration to arrange for the inclusion of individual members at a rate somewhat above that charged for those in groups. At present the established rate is \$2.50 a month per person for full coverage, as described later, and \$2 a month when a member agrees to pay for the first two visits in any illness. Of these payments, 80 cents a month is set aside to pay for hospital insurance, which is carried by an independent but, to some extent, affiliated nonprofit hospital association.

Medical services include home and hospital calls and surgical services. Obstetric service is furnished after two years' continuous membership but does not include hospital care. All kinds of laboratory examinations, including x-ray and radium therapy and anesthetics, are provided. Unlimited specialist care is furnished usually after the endorsement of the medical director without regard to the amount. Drugs and appliances are not included. Illness arising from insanity, mental disease, alcoholism, drug addiction, self-inflicted injuries, dental services and injuries covered by workmen's compensation or other insurance are also excluded. The beneficiary member has complete freedom of choice among all physicians who have become professional members. All professional members vote on equal terms on all matters subject to vote, whether members of the California Medical Association or not.

Payments to the physicians are made on the "unit system." This means that a fee schedule exists in which the charges are not expressed in monetary units but in units of service, the cash value of which depends on the total income received. A single unit is an ordinary "repeat" office call, and all other items are multiples of this. For example, a fracture of the clavicle with four weeks' care is thirty units. The amputation of a finger or a toe is six units. A similar unit scale applies to payments for laboratory and x-ray service. It was

recognized by the administrative members of California Physicians' Service at the annual meeting that:¹

There are a great many procedures which are so variable in extent that no unit value has been placed upon them here. Whenever such procedures are performed, the units to be charged for them may be agreed upon by consultation with the Medical Director, pending the time that accumulated experience can include them in the formal schedule.

The unit system of payment is a recognition of the fact that in every system of prepaid medical service there are certain incalculable elements, and if the plan is to

California Physicians' Service

Month	Beneficiary Membership	No. of Patients Served	No. of Doctors Serving Patients	Collections from Beneficiary Members (from Which Professional Bills Are Paid)	Unit Value
Aug. & Sept. '39	1,220	.....	.....	\$2,823.83	\$1.75
Oct. '39	2,270	.....	.....	3,721.98	1.60
Nov. '39	3,700	.....	.....	6,068.15	1.60
Dec. '39	5,742	.....	.....	9,416.86	1.60
Jan. '40	7,000	.....	.....	11,496.60	1.50
Feb. '40	8,437	.....	.....	13,311.00	1.30
Mar. '40	9,322	1,488	868	15,910.44	1.30
Apr. '40	10,868	1,685	1,053	18,137.49	1.25
May '40	11,949	1,964	1,057	20,110.80	1.25
June '40	14,065	1,993	1,109	23,207.10	1.35
July '40	15,608	2,219	1,199	25,868.85	1.35
Aug. '40	16,650	.....	.....	27,409.45	1.35
Sept. '40	17,398	.....	.....	.....	.....

avoid bankruptcy provision for this condition must be made by the insertion of some flexible element which can be varied to balance income. In compulsory sickness insurance and nearly every system of contract practice this flexible element is the quality of the medical service. It is often pointed out that compulsory sickness insurance systems never become bankrupt. Close students of these systems know that this is because the quality and quantity of the medical service

1. California Physicians' Service, California & West. Med. 51: 337 (Nov.) 1939.

MEDICAL EXPENSE FUND OF NEW YORK, INC.

The Medical Expense Fund of New York, Inc., 122 Seventy-Sixth Street, Brooklyn, was organized by physicians in the following counties of New York: Bronx, Columbia, Delaware, Dutchess, Greene, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Sullivan, Ulster and Westchester. The plan was incorporated in October 1939 according to the provisions of the Piper Hampton bill, article IX-C of the insurance laws, as a nonprofit medical expense indemnity corporation for the purpose of furnishing medical expense indemnity to persons who become subscribers to the plan.

The Medical Expense Fund of New York, Inc., has received a permit to operate under the supervision of the State Department of Insurance and the plan has been approved by the State Department of Social Welfare. It is directed by a board of trustees consisting of twenty-four members, at least eight of whom shall be other than physicians. The members of the board of trustees were chosen to represent the various counties included in this plan. The trustees are elected by and are responsible to the administrative members of the plan. A general advisory board consisting of representatives of the Associated Hospital Service of New York, the Hospital Superintendents' Association and other health agencies and the public at large was appointed by the board of trustees.

The management of the plan is directed by an administrative board consisting of five members appointed by the board of trustees. Any physician licensed in the state of New York is eligible for professional membership in the plan, and a

are varied to fit the available income. It is possible to lower the quality or reduce the quantity of medical service in such systems without the knowledge of the patients, who are incapable of judging the character of the medical service received. In the California plan the unit system makes the income of physicians the flexible element and thereby insures that the quality and quantity of the service will not be subject to financial limitations unknown to the patient. The physician's bill presented to the service describes the separate services given and these are then calculated according to the fee schedule expressed in units. The income for any period (it is computed monthly at present) is then divided by the total number of units supplied to all patients during that period, and the result is the value of the unit in cash according to which the physician is paid.

The accompanying table shows growth of membership by months and, for a five months period from March to July 1940, the number of patients served, the number of doctors serving patients, revenue and the unit value.

The growth of beneficiary membership has proceeded steadily at a rate between 1,000 and 1,500 additional members a month from the time of organization. The membership on October 15 was 18,224. Several additional fields of activity are being explored. Officials of several schools have already approached California Physicians' Service with the suggestion that the service take over the medical care of their student bodies. Owing to the fact that the incomes of many of the families of students in educational institutions exceed \$3,000 annually, it is necessary to make special arrangements. The house of delegates has granted permission to make such contracts with schools subject to the approval of the county medical societies in which the schools are located. Negotiations are under way with relief authorities for arrangements for medical care of persons receiving public assistance.

registration fee of \$5 is required of each member. Officers and trustees of the plan and those physicians who are residents in a county in which the Medical Expense Fund of New York, Inc., operates, and who are also members of the house of delegates of the Medical Society of the State of New York, are eligible for administrative membership with voting privilege.

Beneficiary Membership Eligibility Table—Premium Rates and Deductible Sums

Contract Series	Monthly Income		Annual Premium When Enrolled Individually	Annual Premium When Enrolled by Groups	Maximum Indemnity in a Contract Year	Deductible Sums
	With Dependents	Without Dependents				
A	Over \$175	Over \$125	\$17	\$15.00	\$500	\$10.00
B	\$175 to 140	\$125 to 100	15	12.00	500	10.00
C	\$140 to 100	\$100 to 75	12	10.00	500	7.50
D	Under \$100	Under \$75	10	9.00	500	5.00

Beneficiary members include all persons who subscribe for medical expense indemnity benefits under the terms and conditions of the plan. Beneficiary members or subscribers have free choice of physicians from among the participating physicians in the plan.

In case of an emergency or when it is reasonably necessary for the subscriber to obtain medical services from a physician who is not a member of the plan, the subscriber will receive indemnities for medical expenses incurred according to the provision of the contract. The subscriber's contract also provides indemnities for payment of services of a specialist if the subscriber was referred to the specialist by the attending physician. If the subscriber chooses a specialist without first consulting his own physician, the plan will pay indemnities at the rate provided for general medical services and the subscriber must arrange to pay any additional sum himself.

The plan provides four types of subscribers' contracts, as shown in the accompanying table.

Rates for dependents are the same as for subscribers. Dependents are spouse and unmarried children under 18 years of age.

Persons may be enrolled in groups or individually. When enrolled by groups, at least 75 per cent of the group must apply but no medical examination is required. Individual applicants must present a statement from their family physician that they are not in need of immediate medical care. Persons over 65 are not eligible for membership, nor persons whose family physician is not a professional member of the plan.

Beneficiary members are entitled to receive general medical care including home, office and hospital visits, up to \$300 indemnity in any one year, a maximum of \$300 indemnity for

surgical service in a contract year, and up to \$100 in a contract year for services received from a specialist at the request of the attending physician. The contract also provides that a member may receive up to \$50 in indemnities for services from a pathologist, \$100 for diagnostic services of a radiologist and \$300 for radium or x-ray therapy from a radiologist, and \$75 for the services of an anesthesiologist. The total amount of indemnities a beneficiary member may receive in any contract year is \$500. All indemnities are payable directly to the physician who rendered the services, according to a schedule of fees established for the plan.

EXCLUSIONS

Indemnity will not be paid for services for preexisting illnesses or injuries, and there is a ten day waiting period before the contract becomes effective for illnesses, but no waiting period for injuries. Obstetric services are covered only after a ten month waiting period.

Mental disorders and illnesses or injuries due to alcoholic or drug addiction are excluded, or any occupational injuries or illness covered by workmen's compensation laws.

On Sept. 7, 1940, 1,524 physicians residing in those counties in which the plan is to operate had applied for professional membership in the plan. Additional applications are being received daily. The officers contemplated offering the plan to the public some time in October.

OFFICIAL NOTES

ANNUAL CONFERENCE ON MEDICAL EDUCATION AND LICENSURE

In the light of present conditions, more than usual importance attaches to the Congress on Medical Education and Licensure to be held in Chicago Feb. 17 and 18, 1941. The relationship of the medical profession to national preparedness will be discussed by Dr. Lewis H. Weed, chairman of the Medical Section of the National Research Council and a member of the President's committee to coordinate medical activities. The entire program will be published in *THE JOURNAL* early in December.

DOCTORS AT WORK

Doctors at Work is the title of the sixth annual series of dramatized radio programs to be presented by the American Medical Association and the National Broadcasting Company.

The series will open Wednesday, November 13, and run for thirty consecutive weeks, closing with a broadcast from the A. M. A. meeting at Cleveland on June 3, 1941. The program is scheduled for 10:30 p. m. eastern standard time (9:30 central, 8:30 mountain, 7:30 Pacific time) over the Blue network, other N. B. C. stations and Canadian stations.

The programs will dramatize what modern medicine offers the individual in the way of opportunities for better health and the more successful treatment of disease. Incidental to this main theme the programs will explain the characteristics of the different fields of modern medicine and its specialties.

Doctors at Work will be broadcast from scripts by William J. Murphy, N. B. C. script writer and author of many previous A. M. A.-N. B. C. "shows" and other popular radio features. It will be produced under the direction of J. Clinton Stanley, director of Medicine in the News, last season's successful A. M. A.-N. B. C. health program. Supervision will be by the A. M. A. Bureau of Health Education, directed by Dr. W. W. Bauer.

Descriptive posters for local distribution may be had gratis from the Bureau of Health Education, American Medical Association, 535 North Dearborn Street, Chicago. Program titles will be announced weekly in *THE JOURNAL* and monthly in *Hygia*, the Health Magazine.

The titles of the first three programs are as follows:

- November 13, "Want to Be a Doctor?"
- November 20, "The Years in Training."
- November 27, "Through Hospital Corridors."

WOMAN'S AUXILIARY

Pennsylvania

The annual meeting of the woman's auxiliary to the tenth councilor district of the Medical Society of the State of Pennsylvania was held at Pittsburgh, July 17, with Mrs. Howard A. Power, district councilor, presiding. Dr. Charles H. Henninger, Pittsburgh, president of the Medical Society of the State of Pennsylvania, spoke on "Relations of Councilor District to the State Medical Society." An address was delivered by Mrs. Maxwell Lick, Erie, president-elect of the woman's auxiliary to the Medical Society of the State of Pennsylvania. The latest project for the care of convalescent cardiac children in Allegheny County, "Heart House," was described by Miss Martha Leslie, Pittsburgh, executive secretary of the child health division of the General Health Council of Allegheny County.

More than 100 members and guests attended the final meeting of Berks County auxiliary in June. Mrs. LeRoy W. Frederick, retiring president, read a report of the year's activities. The membership is now 131. A contribution of \$200 was made to the Medical Benevolence Fund.

The Chester County auxiliary reported \$100 contributed to the Medical Benevolence Fund at their meeting in June. A silver pin was presented by the auxiliary to the retiring president, Mrs. Michael Margolies, in recognition of her services. Mrs. Howard W. Hassell presided and gave her report for the year. During her term many new members were received, \$275 was turned over to the Medical Benevolence Fund of the state society, and the sewing group made and contributed more than fifty children's garments to hospitals and the Children's Aid Society.

The concluding meeting of the Schuylkill County auxiliary was held in June at Pottsville when officers for the new year were elected and plans made for the Medical Benevolence Fund project. One hundred and eighty dollars, which was derived from a public card party and from private parties, was contributed to the fund.

The York County auxiliary voted \$150 to the Medical Benevolence Fund at their meeting in June. Their membership totals sixty-seven, which includes eleven new members.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

DISTRICT OF COLUMBIA

Society News.—The Baltimore City Medical Society and the District of Columbia Medical Society will hold a joint meeting in Washington, November 13; the speakers will be Drs. Allen F. Voshell, "Progressive Muscular Dystrophy: Its Present Status"; Harris B. Shumacker Jr., "Reactions to Local Anesthetic Agents," and James G. Arnold Jr., "Cauda Equina Tumor with Unusual Symptomatology." All are of Baltimore.

Postgraduate Institute for Negro Physicians.—Howard University conducted a postgraduate institute for Negro physicians, November 3-6, in cooperation with the Tuberculosis Association of the District of Columbia, the Maryland Tuberculosis Association, the Medico-Chirurgical Society and the Social Hygiene Society of the District of Columbia. Tuberculosis, syphilis and maternal and child health were discussed and sessions were open to physicians from the District, Maryland and Virginia. The institute was preceded by a meeting for the public. The speakers included Drs. Clarence Leon Wilson, Chicago, obstetrics; William Roderick Brown Jr., Pittsburgh, tuberculosis; Theodore K. Lawless, Chicago, syphilis, and Edward W. Beasley, Chicago, pediatrics.

GEORGIA

Campaign Against Appendicitis.—The Medical Association of Georgia in cooperation with the druggists of the state recently launched a campaign against appendicitis. Physicians plan to address every high school class in the state as well as parent-teacher groups, woman's clubs and other civic bodies on the meaning of abdominal pain, and the druggists will cooperate by affixing warning stickers to every laxative and cathartic they sell without a prescription. Dr. Thomas C. Davison, Atlanta, is in charge of the association's committee directing the campaign. Subcommittees have been named for each congressional district of the state.

Personal.—Dr. Charles W. Harwell, assistant professor of anatomy, Emory University School of Medicine, Atlanta, has resigned to become a fellow in public health at the University of North Carolina.—Dr. John D. Stillwell, McRae, has been named director of the southeastern region of the state department of public health, which covers twenty-six counties. He will have headquarters in Waycross, succeeding Dr. Bert H. Malone, resigned.—Dr. Charles D. Bowdoin, Atlanta, director of the division of preventable diseases, state department of public health, has been appointed special consultant for the U. S. Public Health Service by Dr. Thomas Parran, surgeon general of the service.

ILLINOIS

Association for the Crippled.—The Illinois Association for the Crippled met at the Hotel LaSalle, Chicago, November 7-8. Subjects to be discussed were "What Is the Role of Our Physically Handicapped Youth in America Today?" "The School of Another Chance" (motion picture) and "The Need for a Program for Spastics in Illinois."

Memorial to Dr. Lockhart.—A bronze tablet was unveiled at the Witt School, September 22, to honor the memory of the late Dr. Charles H. Lockhart, Witt. It was the gift of the teachers and citizens of Witt. Dr. Lockhart had been a member of and president of the Witt Board of Education for twenty-one years. The inscription on the tablet characterizes Dr. Lockhart as "a moral and civic leader and a community leader." The late Dr. Lockhart had also served as mayor of Witt.

Chicago

The Belfield Lecture.—Dr. John Scudder, New York, delivered the twelfth William T. Belfield Memorial Lecture, October 17, before the Chicago Urological Society, on "Some Aspects of Surgical Shock."

Branch Meetings.—Dr. Walter P. Blount, Milwaukee, addressed the South Chicago Branch of the Chicago Medical Society, October 22, on "Fractures in Children Are Different."—Dr. Hugo O. Deuss discussed "Newer Aspects of Tubercu-

losis" before the Southern Cook County Branch, October 22.—The Aux Plaines Branch was addressed, October 25, by Dr. Ralph M. Waters, Madison, Wis., on "Anesthesia."—Dr. Edward William Alton Ochsner, New Orleans, addressed the Calumet Branch, October 25, on "Thrombophlebitis—A Physiologic Consideration of Therapy."—The North Shore Branch was addressed, November 5, by Drs. Chevalier L. Jackson, Philadelphia, and Thomas E. Carmody, Denver, on "Tumors of the Bronchi and Lungs" and "Infections of Face and Mouth" respectively.

MARYLAND

Personal.—Dr. Edward Ross Davies, Ellicott City, formerly health officer of Howard County, has been appointed assistant commissioner of health of Baltimore, effective September 18, to succeed Dr. William H. F. Warthen, who is now health officer of Baltimore County.

Joint Psychiatric Meeting.—The Maryland Psychiatric Society and the neuropsychiatric section of the Baltimore City Medical Society will hold a joint dinner meeting at the Johns Hopkins Faculty Club, Baltimore, November 14. The speakers will be Chandler M. Brooks, Ph.D., on "Relation of the Central Nervous System to Certain Sexual and Reproductive Functions," and Dr. Manfred S. Guttmacher, "Medicolegal Aspects of Mental Disorders."

MASSACHUSETTS

Society News.—Dr. Paul Dufault, Rutland, discussed "The Danger of Infection from Tuberculosis to Hospital Personnel" before the Worcester District Medical Society at the Rutland State Sanatorium, October 9, and Dr. August R. Crane, Rutland, "Pyelonephritis."—The Four County Medical Society, comprising the district societies of Berkshire, Franklin, Hampden and Hampshire, was addressed in Springfield, October 9, by Drs. Soma Weiss, Edward D. Churchill, Foster S. Kellogg and Burton E. Hamilton. They presented a symposium on "Dyspnea and Edema: Their Significance in Diagnosis and Prognosis." All are from Boston.—Dr. Charles H. Robson, Toronto, discussed "Anesthesia for Children" before the New England Society of Anesthesiology, October 7.

Dr. John Gordon Named Charles Wilder Professor of Preventive Medicine at Harvard.—Dr. John E. Gordon, professor of preventive medicine and epidemiology, Harvard Medical School, Boston, and director of the new Harvard Public Health Unit and Harvard-Red Cross Hospital in England, has been promoted to Charles Wilder professor of preventive medicine and epidemiology. This professorship is not restricted to men in one field of medicine. It was last held by the late Dr. Hans Zinsser, who was Charles Wilder professor of bacteriology and immunology. Dr. Gordon recently returned from England, where he made arrangements for the Harvard Public Health Unit for field and laboratory work in epidemiology under wartime conditions and a 100 bed Harvard-Red Cross Hospital for study of wartime communicable diseases. According to an announcement from the university, October 25, he will return to England soon. A native of Minnesota, Dr. Gordon graduated at Rush Medical College in 1925. He has served at the University of Chicago, University of Western Ontario and the Municipal Contagious Disease Hospital, Chicago. He was medical director of the division of communicable diseases of the Herman Kiefer Hospital, Detroit, and from 1934 to 1937 special member of the International Health Division of the Rockefeller Foundation. In 1937 he went to Harvard as professor of preventive medicine and epidemiology. The first Wilder professor was Dr. Milton J. Rosenau, Chapel Hill, N. C., from 1920 until his retirement in 1935. Dr. Zinsser held the title from 1935 until his recent death.

MICHIGAN

State Medical Election.—Dr. Henry R. Carstens, Detroit, was chosen president-elect of the Michigan State Medical Society at its annual meeting in Detroit, September 24, and Dr. Paul R. Urmston, Bay City, was installed as president. Dr. L. Fernald Foster, Bay City, is the secretary. The society will hold its next annual meeting in Grand Rapids.

Immunization Program.—The Muskegon County Medical Society started an immunization program against diphtheria and smallpox among the local children October 1. The program has the approval of the Muskegon Board of Education. Intended for children already enrolled in the public and parochial schools, later the plan is expected to reach children in the preschool age group, it was stated.

Personal.—Dr. Raphael Isaacs, associate professor of internal medicine, University of Michigan Medical School, Ann Arbor, is on a leave of absence for six months to direct a new hematologic service at Michael Reese Hospital, Chicago. —Dr. Reed O. Dingman, formerly of Danville, Pa., has been appointed assistant professor of maxillofacial surgery at the University of Michigan Medical School, Ann Arbor. —An ambulance was recently equipped and sent from Michigan through the British War Relief Society to the British Red Cross in memory of the late Dr. Richard R. Smith, Grand Rapids.

MINNESOTA

Minnesota Foundation Lecture.—The first annual Minnesota Medical Foundation Lecture will be presented at the University of Minnesota Medical School, Minneapolis, November 12. Conrad A. Elvehjem, Ph.D., professor of biochemistry, University of Wisconsin, Madison, will lecture on "The Biochemistry of the Vitamin B Complex."

Personal.—Dr. John Willard Hanson, medical fellow in pediatrics, University of Minnesota Hospitals, Minneapolis, has accepted a position in the health service of the University of Kansas, Lawrence, effective September 1. —Dr. Louis B. Wilson, Rochester, director emeritus of the Mayo Foundation, was the principal speaker at the dedication of the new Museum of Natural History on the University of Minnesota campus, Minneapolis, September 28. Dr. Thomas S. Roberts, Minneapolis, a former practicing physician who has devoted many years to development of the museum, is the director.

Abortionist Sentenced Not to Exceed Eight Years.—Mrs. Hattie Anderson, Mound, pleaded guilty, October 16, to a charge of performing an abortion and was sentenced by Judge Paul S. Carroll of the district court of Hennepin County to a term of not to exceed eight years at hard labor in the Women's Reformatory at Shakopee. A previous conviction in 1933 for a similar offense was a consideration in the sentence. Mrs. Anderson performed the operation on a 21 year old Wisconsin girl, receiving \$25 for her services. The girl was taken to a hospital, where she died, October 8, after having identified the defendant. On the earlier conviction Mrs. Anderson was sentenced to a term of not to exceed eighteen months in the Women's Reformatory but was placed on probation. She violated this probation by performing a subsequent abortion and on Feb. 21, 1936, her stay of sentence was vacated. She served fourteen months and eighteen days for that crime.

NEVADA

State Medical Election.—Dr. George R. Magee, Yerington, was named president-elect of the Nevada State Medical Association at the annual meeting, October 11, and Dr. Henry A. Paradis, Sparks, became president. Dr. Horace J. Brown, Reno, continues as secretary. Next year's meeting will be in Elko, September 26-27.

NEW JERSEY

Society News.—Dr. Norman H. Plummer, New York, addressed the Morris County Medical Society, Greystone Park, October 17, on "Treatment of Pneumonia." —Dr. Robert E. Buckley, New York, addressed the Hudson County Medical Society, Hoboken, October 1, on "Removal of the Larynx for Carcinoma." —Dr. Jay Arthur Myers, Minneapolis, addressed the Bergen County Medical Society, Bergen Pines, October 8, on "Follow-Up Work in Tuberculin Testing Surveys." —Dr. Isidor S. Ravdin, Philadelphia, addressed the Cumberland County Medical Society at Jericho, October 8, on "Problems of Biliary Tract Surgery."

State Society Offers Prize.—The Medical Society of New Jersey has recently authorized an award of \$100 for an essay submitted by a member of the society. The winner is to be determined by a committee of five members of the society. Manuscripts for the 1941 award must be submitted to the secretary's office before April 15, 1941. In addition to the prize, the winner will receive an invitation to present his contribution before the annual meeting of the society.

NEW YORK

Society News.—Speakers at the quarterly meeting of the Ontario County Medical Society, which was held in conjunction with the ninetieth anniversary of the founding of the Clifton Springs Sanitarium and Clinic, October 8, were Drs. Marion A. Blankenhorn, Cincinnati, on "Modern Treatment of

Nutritional Disease"; Joseph C. Doane, Philadelphia, "Peripheral Vascular Disease"; Ross Golden, New York, "Diagnosis and Treatment of Intestinal Obstruction by the Miller-Abbott Tube," and Donald Guthrie, Sayre, Pa., "Use of Silk in Surgery." —Dr. Thomas O. Gamble, Albany, addressed the Medical Society of the County of Albany, October 23, on "Caesarean Section." —Dr. Irvine McQuarrie, Minneapolis, addressed the Medical Society of the County of Monroe, October 15, on "Effect of the War on Civilian Health in China." —The Broome County Medical Society and the Binghamton City Hospital have started the Broome County Medical Library, with rooms at the hospital.

New York City

Incubator Babies at the World's Fair.—Dr. Martin A. Couney, who has been in charge of the infant incubators at the New York World's Fair, recently made a report of results of the care of the infants. Ninety-six babies were cared for during the two years and ten, or 10.4 per cent, died. Of these five arrived at the incubator station in such condition that there was no possibility of saving them. The length of gestation of the infants was as follows: six months nine infants, six and a half months eighteen, seven months thirty-seven, seven and a half months nine, eight months twenty, eight and a half months one, and unknown time two. Classified according to weight the babies were kept in incubators for the following average periods: those from 800 to 1,000 Gm. ninety-one and one third days, from 1,001 to 1,250 Gm. seventy days, from 1,251 to 1,500 Gm. fifty-three days, from 1,501 to 1,750 Gm. forty and a half days and from 1,751 to 2,100 Gm. twenty-nine days. Statistics on the mortality according to weight showed that 27 per cent of the smallest babies died and none of the largest ones. Four of those who died were six and a half month babies and six were seven month babies.

OKLAHOMA

First Conference of County Secretaries.—The first annual conference of secretaries of county medical societies of the Oklahoma State Medical Association was held in Oklahoma City, October 27. Mr. Harvey Sethman, executive secretary of the Colorado State Medical Society, Denver, and Dr. Holman Taylor, secretary of the State Medical Association of Texas, Fort. Worth, were guest speakers. Mr. Sethman discussed "The Relationship of the Medical Profession to the Economic and Political Problems of Today" and Dr. Taylor, "The Necessity of Cooperation Between County Medical Societies and the Executive Office." Subjects discussed included membership, programs, county societies and the Farm Security Administration, hospital insurance and medical service plans, medical preparedness, public relations and county health units.

OREGON

Society News.—Drs. Wendell H. Hutchens and Thomas S. Saunders Jr. addressed the Multnomah County Medical Society, Portland, October 2, on "Some Responsibilities of Physicians in Premarital Examinations" and "The Five Day Treatment of Early Syphilis" respectively. Dr. Richard B. Adams, Portland, reported on the recent meeting of the house of delegates of the Oregon State Medical Society.

Personal.—Dr. Charles T. Chamberlain, clinical professor of otology, rhinology and laryngology at the University of Oregon Medical School, Portland, has retired with the title of emeritus professor. —Dr. Harold L. Blosser, Portland, was recently appointed a member of the state board of medical examiners to succeed Dr. Joseph F. Wood, resigned, it is reported. —Dr. Alexander Bradfield, Tillamook, has been appointed health officer of Tillamook County and Dr. John R. Seeley, formerly of Fresno, Calif., of Coos County.

PENNSYLVANIA

Society News.—Dr. George S. Frauenberger, Philadelphia, addressed the Lebanon County Medical Society, Lebanon, October 8, on "Modern Infant Feeding." —Dr. Jacob Goldblum, Uniontown, addressed the Fayette County Medical Society in Uniontown, October 10, on "Latest Advancement in Radiography." —Drs. Leo D. O'Donnell and William J. Fetter, Pittsburgh, addressed the Cambria County Medical Society, Johnstown, October 10, on "Trauma of the Knee Joint" and "Rheumatoid Arthritis" respectively.

TENNESSEE

Society News.—Dr. John Shelton Horsley, Richmond, Va., was the guest speaker at a meeting of the East Tennessee Medical Association in La Follette, September 12-13, on "Diagnosis and Treatment of Stomach Trouble."—Dr. William R. Cate, Nashville, addressed the Davidson County Medical Society, Nashville, October 15, on "Arteriosclerotic Heart Disease."—Drs. Fay B. Murphey Jr. and Howard M. Ausherman, Chattanooga, addressed the Chattanooga and Hamilton County Medical Society, October 17, on "Medical Aspects of Gallbladder Disease" and "Choice of Anesthesia" respectively.—Speakers at a meeting of the Dyer, Lake and Crockett Counties Medical Society, Dyersburg, October 2, included Drs. De Witt T. Holland, Newbern, on "Toxemia of Pregnancy" and Edward B. Smythe, Tiptonville, "Treatment of Acute Respiratory Infections."

UTAH

State Medical Election.—Dr. John R. Anderson, Springville, was chosen president-elect of the Utah State Medical Association at the annual meeting in Salt Lake City in August and Dr. Alfred C. Callister, Salt Lake City, became president.

VERMONT

Personal.—Dr. Edward James Rogers, Pittsford, superintendent of the Vermont Sanatorium, received the honorary degree of doctor of science from Middlebury College, Middlebury.

State Medical Election.—Dr. Ernest H. Buttles, Burlington, was named president-elect of the Vermont State Medical Society at the annual meeting in Rutland, October 11, and Dr. Albert M. Cram, Bridgewater, became president. The next annual session will be in Burlington.

WISCONSIN

State Medical Election.—Dr. Gunnar Gundersen, La Crosse, was named president-elect of the State Medical Society of Wisconsin at the annual meeting in Milwaukee in September, and Dr. Ralph P. Sproule, Milwaukee, became president. The 1941 meeting, at which the society will celebrate its centennial, will be held in Madison.

Physicians' Bags Stolen.—Dr. Henry W. Kleinschmit, Oshkosh, reports that his car and that of another physician were entered while they were in a parking lot at Whiting, Ind., October 21, and among other things the physicians' bags were stolen. Dr. Kleinschmit's name was engraved on the lockplate of the bag, on his sphygmomanometer and on a prescription pad holder.

Society News.—At the second meeting of the recently organized Wisconsin Tuberculosis Society, Statesen, September 17, the speakers included Drs. George C. Owen, Oshkosh, on "The Prognostic Significance of Positive Gastric Aspiration in the Treated Patient"; David D. Feld, Wauwatosa, "Cavity Drainage," and Henry C. Sweany, Chicago, "Chemotherapy in Tuberculosis."—Drs. Irving I. Cowan and Hans W. Hefke addressed the Milwaukee Society of Clinical Surgery, October 29, on "Lipiodol Injection of Bile Ducts" and "Diagnosis and Therapy of Bone Tumors" respectively.—Dr. Frederick A. Willius, Rochester, Minn., addressed the Medical Society of Milwaukee County, October 11, on coronary disease.

PUERTO RICO

Personal.—Dr. Luis M. Morales, San Juan, has been appointed a member of the Advisory Pardon and Parole Board of Puerto Rico.

Society News.—At the annual meeting of the Ponce District Medical Society, September 22, the speakers were Drs. Lorenzo A. Balasquide, Ponce, on "The Diet of Pregnant Women in Relation to Labor"; Luis A. Passalacqua, Ponce, "Neoprontosil in the Treatment of Empyema"; Americo Serra, Ponce, "Perforated Peptic Ulcer Complicated with Acute Appendicitis"; Capt. Howard W. Doan, M. C., U. S. Army, "Military Medicine," and Dr. Albert V. Hardy, San Juan, "Etiology and Epidemiology of Acute Diarrheal Diseases."—Dr. Winfred Overholser, medical superintendent of St. Elizabeths Hospital, Washington, D. C., addressed the San Juan District Medical Society, October 7, on "The Psychiatrist in Court."—Dr. Gabriel Tucker, Philadelphia, addressed the Puerto Rico Medical Association recently on "Tumors of the Larynx with Special Reference to the Treatment of Carcinoma."

GENERAL

American Physicians' Registration in Great Britain.—The General Medical Council of Great Britain is now authorized to register doctors of Canada and the United States in the Emergency Medical Service for the period of the war, the *Lancet* reported September 28. Conditions of emergency registration are that the applicant is a British subject or a citizen of the United States and that he holds some medical degree or diploma recognized by the General Medical Council as furnishing a sufficient guaranty of the requisite knowledge and skill for the efficient practice of medicine, surgery and midwifery.

Army Medical Library Wishes Reprints.—An announcement from the Army Medical Library in Washington, D. C., by Col. Harold W. Jones, librarian, states that the Army Medical Library is glad to have reprints of articles sent by authors. All such reprints are placed in a special collection and are catalogued by the name of the author. Thus they form a ready bibliography of the work of any given writer and a valuable supplementary source of material when the original volume of publication is temporarily unavailable at the bindery or on loan. Authors would do well to send two reprints of each of their writings to the Army Medical Library for this purpose.

Special Society Elections.—Dr. Ralph Irving Lloyd, Brooklyn, was chosen president-elect of the American Academy of Ophthalmology and Otolaryngology at the annual meeting in Cleveland, October 9. Dr. Frank R. Spencer, Boulder, Colo., will take office as president next January. Vice presidents elected were Drs. Everett L. Goar, Houston, Texas; James M. Robb, Detroit, and Ralph O. Rychener, Memphis, Tenn.—Dr. John L. Rice, health commissioner of New York City, was named president-elect of the American Public Health Association at the annual meeting in Detroit, October 10, and Dr. Waller S. Leathers, Nashville, Tenn., was installed as president. The following were elected vice presidents: Drs. Robert D. Defries, Toronto; Carlos E. Finlay, Habana, Cuba, and Selskar M. Gunn, C.P.H., New York. The 1941 meeting will be in Atlantic City, N. J.

Conference on Industrial Health.—The first American Conference on Industrial Health will be held at Chicago Towers, Chicago, November 14. The theme of the meeting will be "Practical Value and Application of Industrial Health Work." At the luncheon session the speakers will be Drs. Volney S. Cheney, Chicago, on "The American Conference on Industrial Health" and Paul A. Neal, Washington, D. C., "Industrial Health and the National Defense." The dinner meeting will be addressed by Dr. Morris Fishbein, Chicago, Editor of *THE JOURNAL*, on "Industrial Health and the General Practitioner" and Major John L. Griffith, "The Humanitarian Appeal of Industrial Health." The American Conference on Industrial Health was recently incorporated, not for profit, under the laws of the state of Illinois. This meeting is sponsored by the American Association of Industrial Physicians and Surgeons in collaboration with other interested groups.

Cancer Research Fellowships Available.—The Finney-Howell Research Foundation, Inc., announces that all applications for fellowships for next year must be filed in the office of the foundation, 1211 Cathedral Street, Baltimore, by January 1. Applications received after that date cannot be considered for 1941 awards, which will be made March 1. The foundation was provided for in the will of the late Dr. George Walker, Baltimore, to support "research work into the cause or causes and the treatment of cancer." The will directed that the surplus income from the assets of the foundation together with the principal sum should be expended within a period of ten years to support a number of fellowships in cancer research, each with an annual stipend of \$2,000, "in such universities, laboratories and other institutions, wherever situated, as may be approved by the Board of Directors." Fellowships carrying an annual stipend of \$2,000 are awarded for one year with the possibility of renewal up to three years; when deemed wise by the board of directors, special grants of limited sums may be made to support the work carried on under a fellowship.

New Surgical Investigative Society.—The Surgical Investigative Society of the South was recently organized "to exchange ideas and study advances in the field of surgery." Officers include Drs. Ira A. Ferguson, Atlanta, Ga., president; Michael E. DeBakey, New Orleans, vice president, and David Henry Poer, Atlanta, secretary-treasurer. It is planned to hold annual meetings in October, and Baltimore was chosen

MEDICAL NEWS

for the 1941 session. At its first meeting at Vanderbilt University School of Medicine, Nashville, Tenn., October 5-6, the following program was presented:

- Dr. Samuel McLanahan, Baltimore, Use of Sulfanilamide, Sulfapyridine and Sulfathiazole.
 Dr. Richard T. Shackelford, Baltimore, Peritoneoscopy.
 Dr. John V. Goode, Dallas, Texas, Transverse Abdominal Incision.
 Dr. Clarence E. Gardner Jr., Durham, N. C., Use of the Digital Oscilometer in Peripheral Vascular Diseases.
 Dr. W. Paul Sanger, Charlotte, N. C., Lobectomy in Bronchiectasis (movie in color).
 Dr. DeBakey, Wound Infection and Wound Healing.
 Dr. Barney Brooks, Nashville, Effects of Pressure and Temperature on Ischemic Necrosis.
 Dr. Alfred Blalock, Nashville, Activities of the National Research Council in Preparedness.
 Dr. James R. Dawson Jr., Nashville, Rabies.
 Ann S. Minot, Ph.D., and Dr. Katharine Dodd, Nashville, Shock in Children.
 Dr. George S. Johnson, Nashville, Malignant Tumors of the Jaw.

Fellowships in the Medical Sciences.—Fellowships in the medical sciences, similar to those which have been administered by the Medical Fellowship Board of the National Research Council since 1922, will again be available for the year beginning July 1, 1941. These fellowships, supported by grants from the Rockefeller Foundation to the National Research Council, are designed to provide opportunities for training and experience in research in all branches of medical science. They are open to citizens of the United States or Canada who possess an M.D. or a Ph.D. degree and are intended for recent graduates who are not yet professionally established. In addition to these fellowships the Medical Fellowship Board announces two new groups of research fellowships made available through a grant from the National Foundation for Infantile Paralysis, Inc. The first group, open to applicants who hold either the Ph.D. or M.D. degree, is for the purpose of providing opportunities for special training and experience in the study of filtrable viruses. The second group, open only to graduates in medicine who have completed one or more years of hospital experience in clinical surgery and are planning a career in orthopedic surgery, is designed to provide opportunities for training and research in those basic medical sciences which will be of particular value in furthering progress in the field of orthopedic surgery.

Fellows will be appointed at a meeting of the Medical Fellowship Board about March 1. Applications to receive consideration at this meeting must be filed on or before January 1. Appointments may begin on any date determined by the board. For further details concerning these fellowships address the Secretary of the Medical Fellowship Board, National Research Council, 2101 Constitution Avenue, Washington, D. C.

Meeting of Southern Medical Association.—The thirty-fourth annual meeting of the Southern Medical Association will be held in Louisville, Ky., November 12-15, under the presidency of Dr. Arthur T. McCormack, Louisville. On the first day, local physicians will present programs for general and sectional meetings. Among the speakers from states outside those included in the membership of the association will be:

- Dr. Nathan B. Van Etten, New York, President of the American Medical Association, An American Health Program.
 Dr. Don C. Sutton, Chicago, Interrelation Between the Vitamin B Complex and the Anterior Lobe of the Pituitary Gland.
 Dr. Albert Graeme Mitchell, Cincinnati, What Has Mathematics to Do with Pediatrics?
 Dr. Albert F. R. Andresen, Brooklyn, Gastrointestinal Allergy: Present Status.
 Dr. Edward M. Livingston, New York, Use of Endogastric Applicators in Treatment of Cancer of Stomach.
 Dr. James H. Mitchell, Chicago, Differential Diagnosis of Dermatoses of Hands and Feet.
 Dr. Thomas E. Jones, Cleveland, Early Diagnosis and Treatment of Carcinoma of Rectum.
 Dr. Hiram Winnett Orr, Lincoln, Neb., Importance of Primary Care in Treatment of Compound Fractures.
 Dr. Robert A. Kimbrough Jr., Philadelphia, Treatment of Uterine Prolapse.
 Dr. Edward L. Cornell, Chicago, Treatment of Common Complications of Pregnancy.
 Dr. Vincent J. O'Connor, Chicago, Treatment of Malignant Tumors of the Adult Kidney.
 Dr. Harry E. Bacon, Philadelphia, Surgical Treatment of Lymphogranulomatous Strictures of Rectum.
 Dr. Sanford R. Gifford, Chicago, Treatment of Paralytic Strabismus.
 Dr. Edward H. Campbell, Philadelphia, Fenestration of the Labyrinth in Chronic Conductive Deafness: An Analysis of Results Obtained.
 Dr. Edward B. Tuohy, Rochester, Minn., Clinical Use of Intravenous Anesthesia Alone and in Combination with Other Anesthetics: A Method of Anesthesia Eliminating the Hazards of Fire and Explosion.
 Dr. Harry S. Mustard, New York, Education of Public Health Personnel.

There will be a public session Tuesday evening, November 12, at which the speakers will be Drs. James E. Paullin, Atlanta, Ga., on "Syphilis Control in National Preparedness";

Irvin Abell, Louisville, "The Responsibility of Medicine in War and Peace," and Alphonse M. Schwitala, S.J., St. Louis, "Society's Debts to the Doctor." This year for the first time the association will have a hobby exhibit.

Jour. A. M. A.
Nov. 9, 1940

PHILIPPINE ISLANDS

University News.—The *Journal of the Philippine Islands Medical Association* reports that a postgraduate school has been established in the University of the Philippines College of Medicine, Manila. Dr. Antonio G. Sison, dean of the college of medicine, has been appointed director and Dr. Agérico B. M. Sison, assistant professor of medicine, secretary of the new school.

Personal.—Drs. Maria Matias, Manila, and Mariano O. Marfori, Calauan, have been appointed members of the board of medical examiners. Dr. Fernando B. Duran, Calocan, who was reappointed, was elected chairman.—Dr. Mariano C. Icasiano was recently appointed health officer of Manila in connection with the establishment of a new city department of health and welfare.—Dr. Emilio Bulatao, Manila, was recently promoted to be head of the department of physiology and biochemistry of the University of the Philippines College of Medicine to succeed Dr. Isabelo Concepcion, Pasay.

CANADA

Society News.—Dr. Edward Murray Blair, Vancouver, was elected president of the British Columbia Medical Association at the annual meeting at Nelson in September, and Drs. Cecil H. Hankinson, Prince Rupert, and Alfred H. Spohn, Vancouver, were elected vice presidents.—At the annual meeting of the Ontario Association of Pathologists, September 21, in Kingston, the speakers included Drs. Joseph F. A. McMannis, Baltimore, on "Regulation of Blood Flow in the Afferent Arteriole of the Kidney Glomerulus" and Leslie S. Jolliffe, Boston, "Reticulum-Cell Sarcoma of the Humerus."

LATIN AMERICA

Society News.—The fourth Pan American Red Cross Conference will meet in Santiago, Chile, in December. The previous conferences were held in Buenos Aires, Washington and Rio de Janeiro.

FOREIGN

Prize Awarded.—The University of Berne, Switzerland, has awarded its prize for research on encephalitis (The *Journal of the British Medical Association*, August 3, p. 395) to Dr. Beppino Disertori, Trento, Italy, the *British Medical Journal* reports.

British Journal 100 Years Old.—The *British Medical Journal* published its centennial number October 5. The journal was first published as the *Provincial Medical and Surgical Journal*, whose first issue appeared Oct. 3, 1840. The name was changed in 1853 to the *Association Medical Journal* and finally in 1857 to the present title. It was not at first announced as the organ of the British Medical Association, but in 1844 it passed definitely under the control of the association, then known as the Provincial Medical and Surgical Association. The centennial number has several special features, although the war precluded publication of a large special number. There is a retrospective article by Sir D'Arcy Power, long a contributor; a reproduction of the first page of the first issue of the journal containing an "introductory address" explaining its purposes, and numerous congratulatory messages.

Deaths in Other Countries

Dr. Vittorio Putti, professor of clinical orthopedic surgery and dean of the school of medicine of the University of Bologna, Italy, and director of the Rizzoli Institute of Orthopedics in Bologna since 1914, died November 1, aged 60. Dr. Putti was an honorary fellow of the American College of Surgeons. He had been since 1917 editor of *La Chirurgia degli organi di movimento*, published under the auspices of the Rizzoli Institute.

CORRECTION

La Traviata Instead of La Bohème.—In his paper on "The Drama of Tuberculosis" in THE JOURNAL, October 12, page 1272, Dr. James A. Miller stated that the story of La Dame aux camélias was dramatized in the opera La Bohème. This should have been the opera La Traviata.

Foreign Letters

LONDON

(From Our Regular Correspondent)

Oct. 5, 1940.

London Hospitals Carry on

The indiscriminate bombing of London has inflicted considerable damage on the hospitals, of which twenty-five have been hit, some more than once. Nearly all have had windows broken by shell explosions. Doctors and nurses have been killed. But the work of the hospitals goes on without interruption, except that evacuation has sometimes been necessary. There has been no grumbling and no panic, though the wounded have often to be treated while bombs are falling. Mr. Malcolm Macdonald, minister of health, has paid a tribute to their work in which he said that no feature of London's superb resistance to the present ordeal surpassed the way in which the hospitals were performing their duty. Doctors and nurses had risen completely to this historic occasion. Not only by day but at all hours of the night they have received patients without any interruptions except those inflicted by the enemy. Sometimes a hospital has had to evacuate its patients in the middle of the night and that difficult operation has been carried out with remarkable speed and smoothness. Occasionally a ward has been struck, and then the rescue work has been as heroic and devoted as that of any of the civilian soldiers in this war. Thousands of lives had been thus saved in the last few weeks alone. There was a mistaken impression that the government had taken over the hospitals for the duration of the war. They of course were paying for war casualties, both military and civilian, and also for maintaining beds ready to receive them, but they were not contributing for the normal work of providing for the treatment of the sick poor. If they were vital before the war, they were doubly vital now in their new role of refuge, not only for the victims of the incessant bombardment but also for those who were ailing and could not be moved farther afield. Their work was in the very front line of our war effort.

Guy's Hospital may be taken as another example. From the start of the offensive a steady stream of casualties began to arrive. Almost all were suffering from shock, traumatic as well as mental. Not a few had seen relatives fall victims to the bombs. In the majority of cases the immediate problem was resuscitation. Some apparently lifeless persons made a dramatic response. Many of these suffered from multiple perforating wounds of the chest and abdomen, with head injuries and burns. They were soon removed to the operating rooms. To avoid congestion of the wards, as soon as patients who could be moved had sufficiently recovered they were taken in stretcher busses to base hospitals. The students and nurses worked with the greatest coolness and efficiency and, when their work was over, resorted to an underground room, safe from the bombers, to enjoy a well earned rest until the next stream of casualties arrived.

American Dental Ambulance Presented to Britain

The interesting ceremony of the presentation of a dental ambulance, the gift of the American dental profession, took place on the Horse Guards Parade. The ambulance is equipped as an emergency operating room where injuries to the face and jaws can be given immediate attention. It will be manned by a plastic surgeon, a dental surgeon, a dental mechanic and an anesthetist, thus providing the Emergency Hospital Service with the means of sending a specialized team to treat on the spot some disfigured civilian or soldier unfit to be moved. In making the presentation Dr. C. W. Roberts said that many of the donors

had visited this country, where they received a cordial welcome. An opportunity to seal this bond of friendship had been created by the war, of which the American dental profession was proud to avail itself. He was the spokesman of countless Americans whose hearts were with the British people in their hour of destiny.

In accepting the ambulance on the part of the Ministry of Health, Sir Harold Gillies, consultant adviser to the ministry in maxillofacial surgery, said that the gift was a superb gesture of the American dental profession and a most valuable addition to the equipment of the maxillofacial units. On this great occasion he would like to pay tribute to all their dental friends and well wishers in the United States and in particular to one who was a friend of all their friends in both countries. Thanks were also expressed on behalf of the maxillofacial units of the Emergency Medical Service by Mr. Kelsey Fry and on behalf of the British Dental Association by Sir Frank Pearce.

Wartime Dangers to Health

Since the outbreak of war the government has maintained a close watch on the conditions affecting public health. Steps have been taken to provide against not only the dangers always present in time of war but also those likely to result from changing conditions. Careful consideration has to be given to the effect on public health of such factors as troop movements and evacuation. The resulting increase of population of certain areas throws an additional burden on the health services. Among the measures taken are an extension of the system of chlorination of water, which was already in force before the war in many of the larger urban supplies, the establishment of emergency public health laboratories to assist in the rapid detection and suppression of any outbreak of infectious disease and provision of stocks of substances necessary for the prevention and care of such diseases. In normal times every care is taken to ensure the cleanliness of our milk supplies, but it has been pointed out by the Ministry of Information that in such times as the present, special dangers of infection may exist and that maximum protection can be obtained by boiling all milk that has not been already pasteurized or sterilized. The milk should be brought to a boil and then quickly cooled.

BUENOS AIRES

(From Our Regular Correspondent)

Sept. 27, 1940.

Control of Poliomyelitis in Buenos Aires

In 1936 poliomyelitis began to spread in Buenos Aires and acquire previously unknown characteristics. Whereas in 1933 only 120 cases had been treated in the hospitals in Buenos Aires, eighty-seven of which originated in the city, only thirty-nine were treated in 1934 (twenty-one from the capital) and 127 in 1935. In 1936, however, 643 cases (343 males, 300 females) were discovered by the Asistencia pública. Since poliomyelitis need not be reported, these figures may not be complete. According to a report by Dr. Cibils Aguirre and his associates in the *Revista de medicina y ciencias afines* (1:29 [No. 5] 1940) the majority of the cases were observed in the summer season. In February there were 106, in March 279 and in April 150 cases. There were only fifty-four cases in May. Greatest morbidity was found at the ages from 1 to 4 years: 0 to 1, forty-seven cases; 1 to 2, 175 cases; 2 to 3, 135 cases; 3 to 4, seventy-nine cases, with a rapid fall thereafter: 4 to 5, fifty-six cases; 5 to 6, forty-six; 6 to 7, twenty-five, and so on. The mortality rate in the 643 cases amounted to fifty-nine (9.175 per cent). Two or more attacks occurred in the same family forty-one times with a total of eighty-eight cases. In forty cases transmission could be definitely proved. Six persons were demonstrated to be carriers of the bacillus and the cause of infection in twelve persons, though normal themselves.

In view of the high morbidity in 1936, a center of prophylaxis was founded in connection with the Asistencia pública, with Dr. Cibils Aguirre as its director. This center has a laboratory, pediatricians, neurologists, hygienists, social workers, a division for educating the public in health and hygiene and an orthopedic workshop.

A special hospital ward has been opened to infected children in the Hospital Muñoz. All children acutely affected or suspected of the disease are assigned to this ward; nonacute cases are assigned to the Hospital Fernández. Likewise a service for securing convalescent serum has been organized. An institute for radiology and physical therapy and an orthopedic division for the special treatment of these patients have also been made available. The center now commands a stock of 6 liters of convalescent serum. A special commission, consisting of specialists in the various fields, is cooperating to provide expert treatment.

Illegitimacy and the Declining Birth Rate

The Argentine statistician Alejandro E. Bunge recently published an interesting study on questions relating to the birth rate. Illegitimacy has been strikingly high in Argentina for many years and has increased since 1910. The illegitimate birth ratio of 220 per thousand live births in 1910 had increased by 1938 to 282 per thousand, varying greatly, however, in regional distribution. In Buenos Aires, the capital city, the rate is 114 per thousand live births, in some provinces 189, in others 355. In the northern provinces it reaches 474 per thousand. The acme is reached in the province of Corrientes with 560 and in a neighboring territory with 660 illegitimate births in every thousand. The social significance of these figures can be appreciated if contrasted with those for other countries in 1935: Greece 12 per thousand, Portugal and the Netherlands 15, the United States 20 (confined to the white population), Bulgaria and the South African Union (white population) 25, Belgium 29, Ireland 33, Canada 37, Switzerland 39, United Kingdom and Australia 44, Italy and New Zealand 47, Yugoslavia 52, Japan 57, Norway 67, France 70, Germany 78, Denmark 85, Hungary 91, Cuba (white population) 124, Sweden 155, Colombia 225, Austria 252 and Argentina 282 per thousand. With the exception of the other South American countries, nearly all of which have a higher illegitimacy rate, Argentina ranks among the highest in the world. It is the interior of the country that accounts for this disproportion. Bunge attributes this high incidence chiefly to the indifference and ignorance of the population. In the provinces where most illegitimate children are born one might regard them as "naturally legitimate" because family life is maintained. Civil marriage is avoided either because of the expense connected with it or because of the remoteness of the seats of civil registration. This, however, does not explain the increasing illegitimacy rate in the large cities. Here the numerical effect of the decreased birth rate makes itself felt.

The decrease in the birth rate may be judged from the following statistics: In 1910 the birth rate stood at 38.3 per thousand inhabitants; in 1938 it had fallen to 24.3. The loss in actual births between 1910 and 1938 is set at 2,000,000. Compared with the actual number of births in 1910 and 1938, the birth of legitimate children has increased only by 18 per cent, whereas the illegitimate birth rate rose to 63 per cent. The birth rate was observed to decline during 1910-1938 in the levels of the population that were economically and culturally superior. Accordingly, the birth rate fell especially in the strata of society in which illegitimacy is scarcely found to occur. To improve the situation the more privileged classes of society will need to revise their social outlook. Extensive campaigns will have to be conducted in the interior of the country promoting the regularization of numerous loose family relations. This would reduce illegitimacy to a minimum within a few years.

Compulsory Antismallpox Vaccination

By decree of the president of the republic of Bolivia, vaccination and revaccination against smallpox have been made obligatory. Vaccinations are to be carried out during the first three months of each year.

Personals

Dr. Juan Armando Nesi, who has been connected with several hospitals in Buenos Aires, received a fellowship from the Argentine Association for Scientific Progress to continue his studies in anesthesiology at the Mayo Clinic, Rochester, Minn.

Prof. Alejandro J. Pavlovsky of Buenos Aires has left for the United States to work at the Memorial Hospital in New York and with Overholt, Graham, Churchill, Rienhoff and Lahey. He has also been commissioned to study hospital organization in the United States.

Dr. Ricardo Detchessary of Buenos Aires has left for the United States to study the treatment of infantile paralysis.

The atheneum of the chair of the history of medicine in Buenos Aires, in charge of Prof. Juan Ramón Beltrán, has named Prof. Henry Sigerist of Johns Hopkins University and Esmond R. Long as honorary members.

Dr. Juan Ramón Beltrán, professor of the history of medicine in Buenos Aires, has been made an honorary member of the Peruvian Society for the history of medicine.

The honorary degree in sciences was conferred on Dr. Mariano R. Castex, professor of internal medicine in Buenos Aires, by Oxford University.

Dr. Américo Albrieux, head of the endocrinology service in Montevideo, was awarded a fellowship by the Guggenheim Foundation and has left for the United States.

Dr. E. Mira, formerly professor of psychiatry in Barcelona, Spain, and at present residing in Buenos Aires, has been authorized by the faculty of medicine of Buenos Aires to lecture on psychotherapy.

Dr. S. Morra was elected dean of the faculty of medicine at the University of Córdoba in place of Prof. Stuckert, whose tenure of office had expired.

Dr. Anibal Roberto Valla, associate professor in the surgical clinic directed by Prof. Alejandro Ceballos, has received a year's fellowship from Columbia University, New York, for the study of several fields of surgery, of social medicine and of industrial accidents.

Marriages

HERMAN IVAN SLATE, Matewan, W. Va., to Miss Esther Grace Heiser of New Paltz in Poughkeepsie, September 1.

FREDERICK GILBERT MEDINGER, New York, to Miss Jean Isabel Marbarger of Palmyra, Pa., September 14.

CONSTANCE ANTHONY D'ALONZO to Miss Shirley Ruth Bryant, both of Wilmington, Del., October 4.

WILLIAM LEE RAMSEUR, Kings Mountain, N. C., to Miss Christine Rhyne of Mount Holly in August.

SAMUEL MARION WILKES, Philadelphia, to Miss Margaret Zelene Gray in Laurens, S. C., in July.

MARY ELIZABETH WILTBERGER to Mr. Norman Summerville, both of Toledo, Ohio, September 21.

SCOTTIE JACKSON WILSON, Urbana, Ill., to Miss Mary Jane Lohman of Minneapolis in July.

A. SIDNEY BARRITT JR. to Miss Margaret Elsie Kearney, both of Brooklyn, September 14.

WILLIAM J. MILLER to Miss Dorothy Menefee, both of Columbus, Ohio, September 21.

ALDEN B. OAKES, Mount Vernon, Ohio, to Miss Ann Lantz in New York, September 24.

RICHARD B. WILSON, Atlanta, Ga., to Miss Elizabeth Maness in Austell recently.

Deaths

Kurt Semsroth, Amsterdam, N. Y.; Julius-Maximilians-Universität Medizinische Fakultät, Würzburg, Bavaria, Germany, 1923; member of the American Association of Pathologists and Bacteriologists; assistant in pathology, Cornell University, New York, from 1925 to 1927; pathologist, Western Pennsylvania Hospital, Pittsburgh, from 1927 to 1935; teaching fellow in bacteriology, Harvard University, Boston, 1935-1936; director Montgomery County Laboratories since 1936; associate in pathology and bacteriology, 1936-1937, and associate in pathology at Albany (N. Y.) Medical College since 1937; pathologist on the staff of the Amsterdam City Hospital and St. Mary's Hospital; aged 41; died, September 22, at Raybrook of pulmonary tuberculosis.

Andrew Aldridge Matthews, Spokane, Wash.; University of Maryland School of Medicine, Baltimore, 1900; member of the Washington State Medical Association and the Pacific Coast Surgical Association; past president of the Spokane County Medical Society, North Pacific Surgical Association and the Spokane Surgical Society; fellow of the American College of Surgeons; veteran of the Spanish-American and World wars; surgeon to St. Luke's Hospital and superintendent, 1904-1905; superintendent of the University Hospital, Baltimore, 1902-1903; aged 62; died, September 23, in the Swedish Hospital, Seattle, of carcinoma of the stomach.

Harry Burr Ferris, New Haven, Conn.; Yale University School of Medicine, New Haven, 1890; instructor of anatomy, 1891-1892, assistant professor from 1892 to 1895, professor from 1895 to 1897 and from 1897 to 1933 E. K. Hunt professor of anatomy and since 1933 emeritus professor at his alma mater; member and past president of the Connecticut State Medical Society; member of the American Association of Anatomists; formerly vice president of the New Haven County Medical Society; author of monographs on the anthropology of South American Indians; aged 75; died, October 12.

Leon Shulman * Los Angeles; University of California Medical Department, San Francisco, 1911; formerly associate professor of medicine (tuberculosis) at the College of Medical Evangelists, Los Angeles; member of the American College of Chest Physicians; fellow of the American College of Physicians; served during the World War; for many years on the staff of the Los Angeles General Hospital; at various times on the attending and consulting staff of the Los Angeles Sanatorium, Duarte, and chief of staff and chairman of the medical advisory board; aged 55; died, September 17.

Frank Vander Bogert * Schenectady, N. Y.; University of Pennsylvania Department of Medicine, Philadelphia, 1900; formerly associate in pediatrics at the Albany (N. Y.) Medical College; member of the American Academy of Pediatrics; fellow of the American College of Physicians; chairman of the medical advisory board of the city public schools; for many years on the staff of the Ellis Hospital; aged 66; died, September 24, of coronary thrombosis.

Alfred F. Snyder, Hibbing, Minn.; Rush Medical College, Chicago, 1884; past president of the Delta County Medical Society and the Upper Peninsula Medical Society; formerly member of the board of education of Escanaba, Mich., and city physician; at one time on the staff of St. Francis Hospital, Escanaba; aged 84; died, September 25, of hypostatic pneumonia, arteriosclerosis and hypertension.

David Bigelow Lovell * Worcester, Mass.; College of Physicians and Surgeons, medical department of Columbia College, New York, 1889; member of the American Ophthalmological Society, American Otolological Society and the New England Ophthalmological Society; on the staffs of the Memorial and St. Vincent hospitals; aged 75; died, September 17, of arteriosclerotic heart disease.

John T. J. Battle * Greensboro, N. C.; College of Physicians and Surgeons, Baltimore, 1884; member of the county board of health; formerly member of the state board of medical examiners; medical director of the Jefferson Standard Life Insurance Company; formerly member of the board of trustees of Meredith College, Raleigh; aged 81; died, September 30, in the Wesley Long Hospital.

Charles Edwin Heller, Williamsport, Pa.; Jefferson Medical College of Philadelphia, 1890; member of the Medical Society of the State of Pennsylvania; past president of the Lycoming County Medical Society; a trustee, member of the hospital board of managers and medical consultant on the staff of the Williamsport Hospital; aged 75; died, September 24, of carcinoma of the bladder.

Mathew Steward Hosmer, Ashland, Wis.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1882; member of the State Medical Society of Wisconsin; aged 83; on the staffs of the Ashland General Hospital and St. Joseph's Hospital, where he died, September 22, of cardiac decompensation, chronic nephritis and hypertrophy of the prostate.

Francis De Armond Gibbs * Surgeon Lieutenant Commander, U. S. Navy, retired, Arlington, Va.; Georgetown University School of Medicine, Washington, D. C., 1914; entered the navy in 1917 and retired in 1936 for incapacity resulting from an incident of service; aged 50; died, September 22, in the United States Naval Hospital, Washington.

La Salle Archambault * Albany, N. Y.; Albany Medical College, 1902; member of the American Neurological Association; served as instructor, lecturer, adjunct professor and professor of neurology at his alma mater; on the staff of the Albany Hospital; formerly on the staff of the Child's Hospital; aged 61; died, September 28, of pneumonia.

William H. Jessup * Hollis, N. Y.; University of Buffalo School of Medicine, 1900; fellow of the American College of Surgeons; attending surgeon to the Jamaica (N. Y.) Hospital and Creedmoor State Hospital, Queens Village; courtesy surgeon to the Mary Immaculate Hospital, Jamaica; aged 65; died, September 18, of coronary thrombosis.

Alfred Grant Tinney * Surgeon Lieutenant Commander, U. S. Navy, retired, San Diego, Calif.; Jefferson Medical College of Philadelphia, 1903; entered the navy in 1920 and retired in 1935 for incapacity resulting from an incident of service; aged 60; died, September 5, of chronic nephritis, pulmonary tuberculosis and coronary disease.

Joseph Lawrence Stech * Council Bluffs, Iowa; Creighton University School of Medicine, Omaha, 1921; president of the Pottawattamie County Medical Society; instructor of clinical surgery at his alma mater; on the staffs of the Mercy Hospital and the Jennie Edmundson Memorial Hospital; aged 43; died, September 13, of heart disease.

John Brewer Powers, Wake Forest, N. C.; Columbia University College of Physicians and Surgeons, New York, 1907; served during the World War; formerly a captain in the medical corps of the United States Army; aged 59; died, September 22, in the Mary Elizabeth Hospital, Raleigh, of chronic myocarditis and arthritis.

William Gurden Wight * Lansing, Mich.; Michigan College of Medicine and Surgery, Detroit, 1905; past president of the Ingham County Medical Society; on the staff of St. Lawrence Hospital and the Sparrow Hospital, where he was formerly secretary of the board; aged 64; died, September 13, of carcinoma of the pancreas.

Charles Nicholas Olsen Leir, Des Moines, Iowa; Drake University Medical Department, Des Moines, 1901; member of the Iowa State Medical Society and the Radiological Society of North America; served during the World War; aged 70; died, September 22, in the Veterans Administration Facility of chronic myocarditis.

Robert Andrew Buchanan, Lima, Ohio; Cleveland Homeopathic Medical College, 1901; member of the Ohio State Medical Association; formerly member of the board of education; aged 63; on the staffs of St. Rita's Hospital and the Memorial Hospital, where he died, September 19, of diabetes mellitus and chronic nephritis.

John Francis Lynch * Hartford, Conn.; Yale University School of Medicine, New Haven, 1924; fellow of the American College of Surgeons; attending surgeon, St. Francis Hospital; consulting surgeon to the Neuro-Psychiatric Institute of the Hartford Retreat; aged 41; died, September 27, of heart disease.

William Henry Boozer, Anniston, Ala.; Atlanta (Ga.) School of Medicine, 1909; member of the Medical Association of the State of Alabama; aged 54; died, September 16, in the Highland Baptist Hospital, Birmingham, of peritonitis due to perforated duodenal ulcer and chronic cholecystitis.

William Aloysius O'Brien Jr., Passaic, N. J.; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1936; member of the Medical Society of New Jersey; aged 33; died, September 13, in St. Vincent's Hospital, New York, of acute military tuberculosis.

Washington Parker Stowe, Miami Beach, Fla.; University of Michigan Medical School, Ann Arbor, 1918; member of the American Society of Clinical Pathologists; on the staff of St. Francis Hospital; aged 50; was found dead, September 14, of illuminating gas poisoning, self administered.

Edward Sylvester Ryan, Sheboygan, Wis.; Wisconsin College of Physicians and Surgeons, Milwaukee, 1898; member of the State Medical Society of Wisconsin; served during the World War; aged 66; died, September 27, in Milwaukee of coronary thrombosis and lobar pneumonia.

Lannes Irving Condit ♂ Detroit; Milwaukee Medical College, 1912; fellow of the American College of Surgeons; served during the World War; aged 55; on the staffs of the Receiving Hospital and the Harper Hospital, where he died, September 24, of lobar pneumonia.

Richard Seaton Tyler, Sweet Springs, Mo.; St. Louis Medical College, 1879; member of the Missouri State Medical Association; at one time member of the state legislature; aged 84; died, September 22, in the John H. Bothwell Memorial Hospital, Sedalia, of myocarditis.

William M. Gurganus, Cordova, Ala.; Chattanooga (Tenn.) Medical College, 1894; member of the Medical Association of the State of Alabama; aged 70; died, September 14, in the Baptist Hospital, Birmingham, of carcinoma of the pancreas with metastases to the liver.

Albert E. Vipond, Montreal, Que., Canada; McGill University Faculty of Medicine, Montreal, 1889; served during the World War; founder of the Montreal Children's Hospital; aged 72; died, September 7, in the Western Division of the Montreal General Hospital.

William Shreve Collier ♂ Trenton, N. J.; University of Pennsylvania Department of Medicine, Philadelphia, 1902; fellow of the American College of Physicians; for many years on the staff of St. Francis Hospital; aged 63; died, September 27, of carcinoma of the rectum.

Carl Guille Brown ♂ Scranton, Pa.; Jefferson Medical College of Philadelphia, 1909; served during the Spanish-American and World wars; on the staff of the Mercy Hospital; aged 61; died, September 14, in the Jefferson Hospital, Philadelphia, of brain tumor.

May Farinholt Jones, West Point, Va.; Woman's Medical College of Baltimore, 1897; formerly connected with the State Woman's College, Columbus, Miss., State Teachers' College, Hattiesburg, Miss., and the Mississippi State Sanatorium; aged 74; died in September.

William K. Muller, Philadelphia; University of Pennsylvania Department of Medicine, Philadelphia, 1900; for many years on the staff of the Germantown Dispensary and Hospital; aged 62; died, September 17, in Kingston, N. Y., of carcinoma of the bladder.

Franklin Joseph Keller, Paterson, N. J.; Long Island College Hospital, Brooklyn, 1899; member of the Medical Society of New Jersey; for many years on the staff of St. Joseph's Hospital; aged 66; died, September 18, in Hawthorne of coronary thrombosis.

James McQueen Ledbetter, Rockingham, N. C.; Vanderbilt University School of Medicine, Nashville, Tenn., 1894; member of the Medical Society of the State of North Carolina; aged 71; died, September 17, of coronary thrombosis and cerebral embolism.

Francis Twining Krusen ♂ Norristown, Pa.; Harvard Medical School, Boston, 1913; Hahnemann Medical College and Hospital of Philadelphia, 1914; aged 51; on the staff of the Riverview Hospital, where he died, September 30, of heart disease.

George A. Whippy, Goshen, Ind.; Hahnemann Medical College and Hospital, Chicago, 1891; member of the Indiana State Medical Association; for many years secretary of the city board of health; aged 70; died suddenly in September of heart disease.

William Joseph Slocum Cremin, Sioux City, Iowa; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1906; on the staff of St. Joseph's Hospital; aged 59; died, September 4, of heart disease.

David P. Luke, Camilla, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1911; member of the Medical Association of Georgia; for many years trustee of the school board; aged 54; died, September 14, of coronary thrombosis.

Levi B. Sparkman, Cleveland, Miss.; University of Tennessee Medical Department, Nashville, 1885; member of the Mississippi State Medical Association; Civil War veteran; aged 94; died, September 20, of pneumonia.

Rufus Dillard Moore ♂ Omaha, Texas; Chattanooga (Tenn.) Medical College, 1896; past president of the Morris County Medical Society; for many years health officer; aged 71; died, September 10, of coronary occlusion.

Ernest Wallace Fowler, Los Angeles; College of Physicians and Surgeons, medical department of Columbia College, New York, 1895; aged 68; died, September 19, in the General Hospital of a self-inflicted bullet wound.

Robert Beverly Taylor ♂ San Francisco; Creighton University School of Medicine, Omaha, 1933; aged 33; died, September 15, of injuries received when the horse on which he was riding was struck by an automobile.

Daniel Mosco Randel, Okmulgee, Okla.; St. Louis College of Physicians and Surgeons, 1889; Kansas City (Mo.) College of Medicine and Surgery, 1920; aged 74; died, September 4, in El Paso, Texas, of arteriosclerosis.

John Claude Hull, Port Arthur, Texas; Tulane University of Louisiana School of Medicine, New Orleans, 1926; member of the State Medical Association of Texas; aged 37; died, September 19, of a gunshot wound.

George Joseph Plehn ♂ New York; Cornell University Medical College, New York, 1920; for many years chief of the staff of roentgenology, City Hospital; aged 46; died, September 6, of coronary occlusion.

Harry E. Klingaman, Emmaus, Pa.; Medico-Chirurgical College of Philadelphia, 1911; member of the Medical Society of the State of Pennsylvania; aged 55; died, September 18, of carcinoma of the colon.

Hillary Romines, Garland, Texas; Baylor University College of Medicine, Dallas, 1919; member of the State Medical Association of Texas; aged 60; died, September 14, of a self-inflicted bullet wound.

George L. Bumgarner, Natrona, Pa.; Jefferson Medical College of Philadelphia, 1892; aged 71; died, September 21, in the Wernersville (Pa.) State Hospital of acute retention of the urine with uremia.

Arthur Thomas Whitney, Houlton, Maine; Boston University School of Medicine, 1927; member of the Maine Medical Association; aged 40; was drowned, September 22, when his sailboat capsized.

John Adam Kappelman, Evanston, Ill.; Northwestern University Medical School, Chicago, 1907; served during the World War; aged 60; died, September 23, in St. Francis Hospital of angina pectoris.

Thomas Washington Ferguson, Detroit; Trinity Medical College, Toronto, Ont., Canada, 1901; member of the Michigan State Medical Society; aged 64; died, September 24, of coronary thrombosis.

Dallas Seth Boles, Ava, Ill.; Washington University School of Medicine, St. Louis, 1901; member of the Illinois State Medical Society; aged 63; died, September 12, of heart disease.

Guy Fulton Hobbs, Indianapolis; Indiana University School of Medicine, Indianapolis, 1911; formerly on the staff of the Methodist Hospital; aged 54; died, September 21, of heart disease.

William E. Guntrum, Greenville, Ohio; Medical College of Ohio, Cincinnati, 1893; member of the Ohio State Medical Association; aged 76; died, September 21, of cerebral hemorrhage.

James C. Waddy, Greensboro, N. C.; Meharry Medical College of Walden University, Nashville, Tenn., 1904; aged 57; died, September 21, of cardiac dilatation and cirrhosis of the liver.

William Reginald Sullivan ♂ Merced, Calif.; University of Kansas School of Medicine, Kansas City, Kan., 1935; aged 30; died, September 3, of a self-inflicted bullet wound.

Francis Joseph Abt, Cincinnati; Eclectic Medical College, Cincinnati, 1914; aged 53; died, September 18, of cerebral hemorrhage and diabetes mellitus.

Elisha Grove Anthony ♂ Indianapolis; Physio-Medical College of Indiana, Indianapolis, 1889; aged 72; died, September 28, of coronary occlusion.

Hugh S. Hart, Pamplin, Va.; University College of Medicine, Richmond, 1899; aged 68; died, September 11, of carcinoma of the cervical glands.

Sherman Alonzo Allen, Imogene, Iowa; Northwestern Medical College, St. Joseph, Mo., 1883; aged 88; died, September 7, of uremia.

Irvin Merrill Bierman, Newark, N. J.; Denver College of Physicians and Surgeons, 1908; aged 65; died, September 27, of heart disease.

John Milton Thompson, Walters, Okla.; Dallas (Texas) Medical College, 1903; aged 67; died, September 10.

Bureau of Investigation

BRINKLEY ON THE BRINK? II

IN THE JOURNAL for October 19 attention was called to an article in a Little Rock, Ark., newspaper for October 4, which indicated that malpractice suits were catching up with charlatan Brinkley. An item dated October 17 contains not only additional information concerning some of the cases previously mentioned but some new and surprising statements. Apparently default judgments were ordered in two of these suits: Charles F. Allen, administrator of the estate of J. F. Crenwelge, seeking \$264,271, and E. P. Lambert, administrator of the estate of Abner Johnson, seeking \$90,000. These individuals charged that Dr. Brinkley was responsible for the deaths of Johnson and Crenwelge. Judge Trimble tagged as "not timely" a motion by Dr. Brinkley's lawyers requesting that their client be not required to appear in Little Rock to give depositions, or that the depositions be taken in Del Rio, Texas, the doctor's home. The judge added that the only question was whether Dr. Brinkley wilfully violated an order of the court in failing to appear October 4 and 5 to give depositions. It was claimed that Brinkley had failed to appear in court because a "business crisis" had prevented him from coming to Little Rock. Furthermore, one Tom W. Campbell, representing Brinkley, said that the doctor's business had been "definitely destroyed" by more than twelve damage suits filed in an attempt to "mulct the defendant" and added that the doctor's income had "dwindled from \$1,000,000 annually to nothing." He stated, further, that at the time Dr. Brinkley was to have appeared in Little Rock he was conferring with associates in Kansas City, Mo., in an attempt to raise money to pay income tax. Judge Trimble overruled efforts of a Brinkley representative to introduce a deposition by a former employee at the Country Club Hospital which he claimed would show that Dr. Brinkley left Little Rock last July for Memphis and remained in a hotel there until a "recent date." Brinkley is said to have conducted the hospital's business from there.

The fact that Brinkley is encountering all of these difficulties in Little Rock, plus the fact that the article quoted refers to him as "former operator of the Country Club Hospital" at Little Rock, has an interesting reflection in a plea signed by the mayor, the president of the Rotary Club, and many other citizens of Del Rio urging the return of their adopted wayward son. The consummation of these unbelievable plans is not yet announced. The plea is reproduced herewith. A few days later the Del Rio *News-Herald*, which, under date of October 23, carried as its principal headline "Brinkley Hospital To Be Located Here." A statement is quoted which, it claimed, was issued by Dr. and Mrs. John R. Brinkley, announcing that they had "permitted some of the business men of Del Rio to incorporate and locate in Del Rio, Texas, The Brinkley Hospital for the purpose of using Doctor Brinkley's famous treatments." Dr. Brinkley claimed, according to the article, that the decision was made "at the urgent plea of hundreds of Del Rio people who say the town is in serious need of the assistance that Dr. Brinkley can give it as a winter resort and health center" (sic).

When Brinkley closed his hospital in Del Rio a number of years ago, one of the principal reasons, according to him, was the efforts of certain individuals to divert to some other doctor patients coming to Del Rio to the Brinkley Hospital. The situation in this regard was dealt with in an article in the *Saturday Evening Post* about Brinkley, by J. C. Furnas, entitled "Country Doctor Goes to Town":

What happened was that a well established Del Rio surgeon suddenly went off the ethical rails and started advertising over the border station XEPN that he could and would do the famous "compound operation" for only \$150—far below Brinkley's bottom price of \$360 for the prostate job alone. Then high-pressure men appeared on board the westbound Southern Pacific trains at Uvalde to spot elderly passengers who looked like intending Brinkley customers and persuade them to save money by going to the competing doctor. Presently another group of touts began to rally round at the Del Rio station to rescue backsliders as they left the train. They say that platform was pretty lively back then, what with all the pulling and hauling and the embarrassment of elderly through passengers who had stepped off the train to stretch their legs when perfect strangers rush up and wanted to know if they were suffering from the less decorous ills that Doctor specializes in.

Several times these hostile puller-inners got into gang fights. Some went heeled in the traditional Texas style, in case things got even more serious. Then the local paper began to carry huge advertisements, with no indication of who paid for them, but apparently intended to burlesque the competition with funny pictures and weirdly leering remarks about Ye Olde Prostate Shoppe. Some citizens of Del Rio told me that Doctor had reproached the city fathers pretty severely for letting a rival carry on in this way when he had done so much for the place. But the competition survived the battle, although, since XEPN burned down, it no longer advertises over the air. And it was Doctor who moved.

Shortly before this article appeared in the *Saturday Evening Post*, the Del Rio *News-Herald* for April 8, 1940, published a public notice under the heading "An Ordinance for the Purpose of Prohibiting the Soliciting of Patients by Any Doctor or Person Doing Business in the City of Del Rio, and Defining Certain Terms, Providing for a Penalty and Injunctive Relief, and Providing for Licensing of Carriers of Patients or Other Passengers, and Declaring an Emergency." In line with this, the article in the Del Rio *News-Herald* dated Oct. 23, 1940, includes the following paragraph:

Dr. Brinkley was very emphatic in stating that any effort "to divert to some other doctor even one patient coming to Del Rio for treatment in the Brinkley Hospital would immediately cause him to withdraw his support of Del Rio," and he indicated such action also probably would cause the hospital here to close immediately.

In view of the statement of Brinkley's attorneys in Little Rock that the doctor's income had "dwindled from \$1,000,000 annually to nothing," it is interesting to note in the recent issue of the *News-Herald*: "Dr. and Mrs. Brinkley stated emphatically that 'we own no stock nor do we have anything invested in the Brinkley Hospital, Incorporated,' adding 'The owners will employ trained doctors and nurses and laboratory technicians from the Brinkley staff in Little Rock, Arkansas.'" The statement continued "and they will bring them to Del Rio to administer the genuine Brinkley treatment." Dr. and Mrs. Brinkley are quoted further as saying that they "will speak favorably over the radio in behalf of the city of Del Rio and its winter climate and announce the opening of the Brinkley Hospital in Del Rio, Texas, and will do all in their power to fill the town with tourists, the hospital with patients, and bring prosperity to Del Rio once again."

Can it be that the people of Del Rio will consent to such exploitation when a jury in that very town sustained the accusation of charlatanism against John R. Brinkley made in *Hygia* in February 1938? The verdict of this jury was sustained by the Circuit Court of Appeals of the Fifth District. Finally, a review in the way of a petition for certiorari was denied by the Supreme Court of the United States within the past thirty days. Thus Brinkley is definitely on record as a quack and a charlatan.

An Open Letter

— to —

Dr. and Mrs. John R. Brinkley

— from —

Officials, Leading Citizens and
Other Friends in Del Rio, Texas,
The Home of the Brinkley
Hospital for Four Years, Where
Thousands of Patients Have
Been Treated.

Del Rio, Texas,
October 15, 1940.

We, the undersigned, invite and urge Dr. and Mrs. John R. Brinkley to come home to Del Rio, Texas, with their hospital and fine staff of doctors and nurses and technicians where full confidence in them prevails and where they are respected and loved.

We have heard of the lawsuits that have been brought against you and the other difficulties that have been created for you. Knowing the good you have done and are doing suffering humanity, we invite you back to Del Rio to resume your valuable services to the sick and needy.

We, the undersigned, are officials and citizens of Del Rio and Valverde county, Texas, the home of the Brinkley Hospital.

J. S. BRADFORD, Mayor; GROVER C. POOLE, County Judge; AUBREY WALKER, County Treasurer; J. O. BOOTHE, Vice President Del Rio Bank and Trust Co.; W. S. STEVENSON, Vice President Del Rio National Bank; J. A. WALKER, Cashier Del Rio National Bank; JAS. C. NETTS, Secretary Chamber of Commerce; C. B. WARDLAW, President Wool and Mohair Associations; PHIL B. FOSTER, City Attorney; GROVER C. POOLE, President Rotary Club; PHILIP W. VAUGHAN, President Lions Club; H. V. ATKINSON, City Secretary; S. B. BUCHANAN JR., County Attorney; ILA B. HONEYCUTT, Assistant City Secretary; H. CONGER JONES, County Surveyor; LUCILLE LOWRIE, City Tax Department; F. J. SCHMIDT, Fire Chief; JOHN L. DODSON, U. S. Commissioner; C. C. BROWN, Superintendent Water Works; JULIAN LACROSSE, Attorney; A. L. BROWN, Dentist; JOE E. SANDERS, Doctor of Medicine; F. L. CHILDS, Manager Roswell Hotel; THOMAS M. JOHNSON, Doctor of Medicine; REV. S. M. RATLIFF, Pastor First M. E. Church; RAY ROSS, Postmaster.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

FREQUENT FEEDINGS IN DIABETES

To the Editor:—In the treatment of diabetes it has been found that many patients can manage a certain amount of carbohydrate by themselves without taking insulin. They cannot, however, handle enough to supply the necessary daily total calories. Therefore insulin is given to cover this necessary excess, which the body cannot handle. Since the pancreas can furnish enough insulin for a certain amount of sugar at one time yet cannot furnish enough for one whole meal, why not attempt to determine the amount the body can handle at one time and give just that amount in say five or six meals or often enough to make the daily total requirement of calories, rather than giving the whole amount in the usual three meals? I have seen nothing in the literature concerning multiple small meals in the treatment of diabetes and I have not had the opportunity to try this myself as yet. Has this been tried? If so what were the conclusions as to why it didn't work? Perhaps for some reason that I don't know this is unscientific, yet I have mentioned it to a number of my friends and no one seems to know whether it would work or not. What do you think of the idea?

Robert A. Peterman, M.D., Hicksville, N. Y.

ANSWER.—Frequent feedings of carbohydrate favor its utilization. Indeed, frequent feedings of carbohydrate to an individual supplied with insulin, endogenous or exogenous, constitute a sort of Staub-Traugott or Exton phenomenon. Frequent feedings are always useful for the patient taking protamine zinc insulin, for several reasons: 1. The lowering of the total carbohydrate at a meal, by the taking away of a small quantity for lunches, brings the carbohydrate at that meal to a level which the slowly acting protamine zinc insulin can control. 2. These feedings also protect against the danger of reactions between meals when the blood sugar is low. 3. It is always advantageous in the administration of carbohydrate to a diabetic patient to get the benefit which results from the falling tide of a blood sugar curve, because that decidedly favors the utilization of carbohydrate in contrast to a rising blood sugar curve which hinders it. 4. By promotion of oxidation of carbohydrate between meals the development of acidosis is averted. (These statements are taken nearly verbatim from the *Treatment of Diabetes Mellitus*, by Elliott P. Joslin, Howard F. Root, Priscilla White and Alexander Marble, ed. 7, Philadelphia, Lea & Febiger, 1940, p. 319.)

Experimentally it is of interest that Bertram (*Die Zuckerkrankheit*, ed. 2, Leipzig, Georg Thieme, 1939, p. 78) recalculated von Holm's experiments with a completely depancreatized dog for a man weighing 60 Kg. The results showed that if insulin ran into the vein of the fasting theoretical man without a pancreas continuously for twenty-four hours he would need but 7.8 units; if at the same time dextrose was injected sufficient to maintain the man's total caloric requirements the amount of insulin necessary to utilize it would be only 48 units.

STRAINING AT STOOL AND RECTAL DISEASE

To the Editor:—Are the rumors about sitting long on toilet seats before and after or in hopes of obtaining a stool bad and if so why? Can hemorrhoids or a tendency to get them be increased by such action? Also just what is considered the correct time to try to establish bowel time? What is supposed to be the right height for a bowl? Should the seat be of such a height that the rectum is at a lower level than the knees (in the belief that a sharper jackknife position makes less straining necessary)? Is there any truth in the idea that sitting on stone stools or parapets or any cold stone for any length of time increases possibilities of rectal disorders? These questions arise often and an authoritative answer would be appreciated. Joseph Katz, M.D., Cincinnati.

ANSWER.—Sitting on a toilet seat is in itself no more harmful than sitting on a chair. Straining at stool is, however, another matter. It increases the pressure within the hemorrhoidal veins and tends to evert the rectal mucosa. Whether this in itself can lead to hemorrhoids or other rectal or anal disease is debatable. It appears more likely that straining may aggravate conditions already present but these are primarily due to other factors. When an unusual amount of straining is necessary, attention should be directed to its cause. A hard constipated stool may be amenable to dietary regulation. Local rectal or anal disease may lead to organic or spastic narrowing of the lumen. Straining is then necessary until its underlying cause is removed.

The gastrocolic reflex is generally most active immediately after breakfast and, since this is usually a convenient time for bowel action, many people easily become accustomed to go to stool at this time of day.

A toilet bowl from 15 to 18 inches in height has been found satisfactory for the average adult. This height permits a comfortable position and allows flexion of the trunk toward the thighs when desired. The latter facilitates without much voluntary effort the increase in intra-abdominal pressure which normally precedes a bowel movement.

Sitting on stone or cold surfaces is not likely to have a local effect. There is no conclusive evidence that it causes rectal or anal disease. It may, however, aggravate pathologic conditions already present.

DENTAL CARIES AND HEREDITY

To the Editor:—Does heredity play any part in dental caries?

M.D., Illinois.

ANSWER.—This question cannot be answered with finality from present knowledge. The absence of carious lesions in the teeth of one or both parents furnishes no assurance that the children will be free from caries if subjected to environmental circumstances favorable to the disease. The diminished incidence of caries in primitive races is not due to hereditary immunity, as evidenced by the carious activity repeatedly noted with changes in the subject's diet. The preference for certain dishes and types of diet is often handed down from one generation to another, which may suggest hereditary influence that actually is entirely environmental.

While the preponderance of evidence at the present time places the emphasis on the circumstances which permit and favor the production of acid at the site of the lesion and its confinement in these areas for sufficient time and in appropriate state to decalcify the tooth substance, there is little known of the obscure factor possessed by a few individuals which inhibits the production of lesions where favorable environmental circumstances seem to prevail. Whether this factor will be found to be of hereditary nature is a matter of conjecture.

At this time the most that can be said for the role of heredity in the prevention of caries is the nonspecific but unfavorable effect which the form and structure of the teeth as well as the constitutional factors of metabolism and salivary composition may exert on the disease. The form of the tooth bears some relation to the areas favorable for attack. The structure of the tooth appears to have some influence on the rate and manner of progress of the lesion. These are secondary to the active etiologic agent, however, for no physical properties of the teeth have been discovered which prevent the disease. They may affect the intensity demanded of the causative agent to initiate a lesion and the rate at which it progresses.

ALLERGY TO PARASITES

To the Editor:—In *The Journal*, July 6, page 74, mention is made of "intracutaneous tests with extracts of common parasites (Ascariis, pinworms and the like)." What is the diagnostic value of these tests and where can these extracts be obtained? I have seen many convulsions in children and young adults clear up after administration of santonin and passage of roundworms. Is this a common experience? If so, what is the cause of the convulsions? M.D., West Virginia.

ANSWER.—The only commercially available antigens for the diagnosis of common nematode infections are Ascaris antigen prepared by the Lederle Laboratories and Trichinella antigen marketed by Eli Lilly and Company. The latter antigen is of considerable aid in the diagnosis of trichinosis. Other nematode antigens have been used experimentally but have not come into general use for the diagnosis of parasitisms because of the difficulty in obtaining material and the inconsistencies in the experimental results. Such antigens may be of value in determining sensitization to various worm proteins but are not of practical value for the diagnosis of intestinal parasitisms. It is possible that small quantities of various nematode antigens can be obtained for experimental use from laboratories engaged in research on the immunologic aspects of helminthic infections.

Individuals with allergic manifestations who harbor intestinal parasites should be treated for their parasitisms in spite of the results of cutaneous tests with homologous antigens. Except for Trichinella, the diagnosis of the common intestinal parasites in this country should be made by the usual methods of stool examination. Such examination will reveal in most cases the presence of ova or larvae of the intestinal parasites. However, in the case of pinworm infestation the NIH swab (*Am. J. Trop. Med.* 17:445 [May] 1937) should be used.

A number of the older European investigators have attributed convulsions to *Ascaris* infections. More recently Leitch (*J. Trop. Med. & Hyg.* 32:340 [Dec. 2] 1929) attributed convulsions to a toxic principle elaborated by *Ascaris*. Sensitization, occurring to the extreme degree that it may form ascarid proteins, might also be a cause for convulsions.

APLASTIC ANEMIA

To the Editor:—For the past six months I have been observing a man of 21 whose chief complaint is weakness, shortness of breath and pallor. The physical examination is completely negative except for the generalized pallor. There is no jaundice or adenopathy and the spleen is not palpable. The past history is inconsequential, as he has had only pertussis and chickenpox. No members of his family have had similar complaints and there is no reason to suspect industrial or any other type of poisoning. He is a farmer and has always led a temperate life. The initial blood count was red cells 1,030,000, hemoglobin 28 per cent, white cells 4,200, polymorphonuclear leukocytes 35 per cent, small lymphocytes 65 per cent. The gastric analysis was normal as studied by the 120 minute fractional method. No blood was found in the stools or gastric juice. The bleeding time was two and one fourth minutes and the coagulation time was two minutes. The platelet count was 57,000. The patient gives no history of hemorrhage at any time. The blood clot retracted normally in one hour. The packed volume of cells is 14 per cent. The volume index of cells is 1.3. The saturation index is 0.9. The Van den Bergh test showed no change. The icterus index is 1. The fragility test showed beginning hemolysis at 44, ending at 34. Many blood smears show nothing striking save the presence of poikilocytes and anisocytes. The sternal puncture revealed 18 per cent polymorphonuclears, 56 per cent small lymphocytes, 2 per cent plasma cells, 10 per cent myelocytes, 10 per cent normoblasts, 2 per cent transitionals and 2 per cent unclassified cells. Roentgenograms of the long bones show no abnormality. The blood Wassermann and Kahn reactions are both negative. Agglutination tests for undulant fever, typhoid, paratyphoid and tularemia are all negative. Since first seeing this patient my endeavor to combat the anemia has included eight blood transfusions, large doses of various iron preparations, liver by mouth and by injection, vitamin therapy, ultraviolet rays, high caloric diet, rest, and extract of bone marrow. The blood transfusions are about the only method of attack that is at all beneficial and they seem to be only temporary. The highest I have found the red count is 2.20 million, but in about ten days after a transfusion it again falls to slightly more than 1 million. There has been no fever whatever except in one seven day period, at which time no cause could be found. It disappeared, however, with the giving of blood. I feel that I am dealing with an odd case of aplastic anemia without hemorrhage and feel justified in keeping up therapy in the hope that regeneration will, or rather might, eventually occur. Any aid as to diagnosis, prognosis or therapy will be appreciated.

V. D. Goodall, M.D., Clifton, Texas.

ANSWER.—From the history and blood picture as presented, the diagnosis of aplastic anemia seems to be the most likely. The examination appears to be complete and but little can be added. However, the report of the sternal puncture does not include the total white count and does not state whether the marrow is aplastic or shows normal activity. In aplastic anemia the total white count is low. One other possibility should be considered, and that is an atypical form of leukemia. It is conceivable that the cells reported as small lymphocytes actually are atypical micromyeloblasts. These cells should be reexamined with this possibility in mind.

Although it is stated that "there is no reason to suspect industrial or any other type of poisoning," it should be determined whether the patient, who is a farmer, has been exposed to arsenic spray.

The repeated blood transfusions should be continued in the hope that blood regeneration may eventually occur. This is probably the only form of treatment that will be of value.

UNHEALED SINUS OF LEG

To the Editor:—A man aged 77 with moderately sclerosed arteries has had what was diagnosed as lipoma extending deep into the calf muscle for several years. About one year ago this condition began to show a change whereby the enlargement took on the feeling of fluid or a cyst. This increased rather rapidly in density but not in bulk up to three months ago, when a small incision was made and the serum contents were evacuated. In this serum were many small cheesy masses which the laboratory reported as broken down fat. There were no demonstrable organisms. It still discharges considerably or practically the same amount now as earlier. It saturates a rather bulky dressing daily. By use of probes we find that this has dissected extensively throughout the muscle. Complete surgical dissection therefore would be impossible. Is injection through the sinus of some sclerosing solution a rational procedure and if so what would you suggest?

M.D., South Dakota.

ANSWER.—If the cavity in this case is lined by endothelium or a serous surface, then and only then would a sclerosing solution seem rational, and in this event any one of the ordinary solutions used for varicose veins would be suitable.

It seems much more likely, however, that this cavity might be lined by granulation tissue, in which event injection of sclerosing solution would not be indicated and might in fact make considerable trouble. The cause of failure to heal of the

sinus must rest either on neoplastic tissue or on infection. The presence of neoplastic tissue could be determined by microscopic examination of the cells, if they could be obtained. If it is due to an infection, one should think first of specific infection such as tuberculosis, syphilis, actinomycosis and tularemia. It would seem wise to inject a guinea pig with some of the material if smears reveal no organisms. A Wassermann or Kahn test should certainly be done. If it is a nonspecific infection, whereas excision might be impossible, a rapid radical incision and healing from the bottom might be effective.

HYPERPHORIA

To the Editor:—A woman aged 51 has never been comfortable with glasses. I gave her corrections: right, plus 125 plus 75 axis 90; left, plus 150 plus 50 axis 120. She has 4 degrees of hyperphoria. I gave her 1 degree prism base down in the right and I base up in the left eye. She needs plus 225 add for reading for Jaeger No. 1 at 16 inches. With this correction she is comfortable for the first time with glasses. But when she looks at a near object having more than one color, for instance an advertisement in a magazine, she gets three dimensions. In other words, she sees the picture as though looking through a stereopticon. I have tried changing the prism strength and cannot give her any help. I should state that with her glasses on she gets normal vision. Her perception is normal and she has no fundus changes. Color perception is normal.

M.D., Michigan.

ANSWER.—With the distance test showing a hyperphoria of four prism diopters, a paresis of a vertically acting muscle should be suspected, and the oculomotor apparatus should be studied with this possibility in mind. Binocular vision at reading distance should also be investigated, as it is not improbable that this particular patient is suppressing the image of one eye in near vision. If, as usually happens, the factors of monocular perspective are stressed by the artist, the sense of depth will be enhanced when colored pictures are viewed with but one eye. The chromatic dispersion in fused flint segments may possibly emphasize this quality.

BLOOD ELECTROLYSIS FOR HYPERTENSION

To the Editor:—In *American Medicine* for November 1927 there appears (on page 686) an article by Dr. E. Northcott on the use of blood electrolysis in the treatment of hypertension. Can you tell me if this method of treatment has had any extensive trial or if it has any rationale behind it? I have inquired among my colleagues who are specialists in the field but none of them have any knowledge of or experience with the method.

Laurence B. Chenoweth, M.D., Cincinnati.

ANSWER.—The paper by Northcott in *American Medicine* roughly elaborates a theory based on assumption to explain senescence and hypertension. There are no scientific facts supporting this vague and nebulous concept, and in the last thirteen years thorough investigations have demonstrated that many of his premises and assumptions are actually erroneous. The few cases reported are unconvincing and no control data are presented. There has been no extensive trial of the electrolytic therapy suggested nor is there likely to be, for it is devoid of logic and based on false assumptions.

BARIUM SULFATE IN INTESTINAL TRACT

To the Editor:—Has any harm been noted from the prolonged use of barium sulfate (1 tablespoon weekly for several months) for the treatment of diverticulitis of the colon and upper intestinal tract? I understand that it is totally insoluble in the gastrointestinal tract, but is it possible for some to be absorbed either in its ingested form or in that of any of its products? If it can be absorbed, how would this product affect the organism?

M.D., Connecticut.

ANSWER.—No harm has been noted from the prolonged use of chemically pure barium sulfate, although the literature reports numerous instances of poisoning by chemically impure barium sulfate. The soluble salts of barium, such as the chloride, sulfide and carbonate, are especially poisonous. It is to be remembered that there is a commercial form of barium sulfate which is used as an adulterant of white powder or white paints, and this is toxic. The chemically pure barium sulfate (baryum sulfuricum purissimum of the German pharmacopeia) is harmless and passes through the body unchanged. Many physicians would question the rationale of the use of the salt in the treatment of disorders of the intestinal tract. It is highly improbable that some of the salt is absorbed either in its ingested form or in that of any of its products. Even if it were, the amount prescribed would in itself be harmless.

References:

- McNally, W. D.: Two Deaths from the Administration of Barium Salts. *The Journal*, June 13, 1925, p. 1805.
Golob, Meyer: *Radiology* 22:486 (April) 1934.
Savignac, R.: *Arch. d. mal. de l'app. digestif*, 12:709, 1923.
Thomas, J. C.: *J. Path. & Bact.* 43:285 (Sept.) 1936.

Medical Examinations and Licensure

COMING EXAMINATIONS

NATIONAL BOARD OF MEDICAL EXAMINERS EXAMINING BOARDS IN SPECIALTIES

Examinations of the National Board of Medical Examiners and Examining Boards in Specialties were published in THE JOURNAL, November 2, page 1570.

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 17-19. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

CALIFORNIA: Oral examination (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California). Los Angeles, Dec. 11. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

CONNECTICUT: * Written. Hartford, Nov. 12-13. Endorsement. Hartford, Nov. 26. Sec., Dr. Thomas P. Murdock, 147 W. Main St., Meriden. Homeopathic. Derby, Nov. 12-13. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: July 8-10. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: * Washington, Nov. 11-12. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: * Tampa, Nov. 18-19. Sec., Dr. W. M. Rowlett, Box 786, Tampa.

HAWAII: Honolulu, Jan. 8-11. Sec., Dr. James A. Morgan, 48 Young Building, Honolulu.

INDIANA: Indianapolis, June 17-19. Sec., Board of Medical Registration and Examination, Dr. J. W. Bowers, Citizens Trust Bldg., Fort Wayne.

IOWA: Des Moines, Dec. 9-11. Dir., Division of Licensure and Registration, Mr. H. W. Grefe, Capitol Bldg., Des Moines.

KANSAS: Topeka, Dec. 10-11. Sec., Dr. J. F. Hassig, 905 N. Seventh St., Kansas City.

KENTUCKY: Louisville, Dec. 3-5. Sec., State Board of Health, Dr. A. T. McCormack, 620 Third St., Louisville.

MAINE: Portland, Nov. 12-13. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: Regular. Baltimore, Dec. 10-13. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. Homeopathic. Baltimore, Dec. 10-11. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, Nov. 12-14. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MISSISSIPPI: Reciprocity. Jackson, December. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MONTANA: Reciprocity. Helena, March 31. Written. Helena, April 1. Sec., Dr. S. A. Cooney, 216 Power Block, Helena.

NEW HAMPSHIRE: Concord, March 13-14. Sec., Board of Registration in Medicine, Dr. T. P. Burroughs, State House, Concord.

NEW YORK: Albany, Buffalo, New York and Syracuse, Jan. 27-30. Chief, Bureau of Professional Examinations, Mr. Herbert J. Hamilton, State Education Department, 315 Education Bldg., Albany.

NORTH CAROLINA: Reciprocity. Durham, Dec. 10. Sec., Dr. W. D. James, Hamlet.

NORTH DAKOTA: Grand Forks, Jan. 7-10. Sec., Dr. G. M. Williamson, 4½ S. Third St., Grand Forks.

OHIO: Columbus, Dec. 9-12. Sec., Dr. H. M. Platter, 21 W. Broad St., Columbus.

OKLAHOMA: * Oklahoma City, Dec. 11. Sec., Dr. James D. Osborn Jr., Frederick.

OREGON: * Portland, Jan. 14-16. Exec. Sec., Miss Lorraine M. Conlee, 608 Failing Bldg., Portland.

PENNSYLVANIA: Philadelphia, January. Acting Sec., Bureau of Professional Licensing, Miss Marguerite G. Steiner, 358 Education Bldg., Harrisburg.

SOUTH CAROLINA: Columbia, Nov. 12. Sec., Dr. A. Earle Boozer, 505 Saluda Ave., Columbia.

SOUTH DAKOTA: * Pierre, Jan. 21-22. Dir., Medical Licensure, Dr. J. F. D. Cook, Pierre.

TEXAS: Austin, Nov. 25-27. Sec., Dr. T. J. Crowe, 918-920 Mercantile Bldg., Dallas.

VERMONT: Burlington, Feb. 11. Sec., Dr. W. Scott Nay, Underhill.

VIRGINIA: Richmond, Dec. 4-6. Sec., Dr. J. W. Preston, 30½ Franklin Rd., Roanoke.

WASHINGTON: * Seattle, Jan. 13-15. Sec., Department of Licenses, Mr. Nelson N. Vaughan, Olympia.

WISCONSIN: * Madison, Jan. 14-17. Sec., Dr. H. W. Shutter, 425 E. Wisconsin Ave., Milwaukee.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: Tucson, Dec. 17. Sec., Dr. Robert L. Nugent, University of Arizona, Science Hall, Tucson.

MICHIGAN: Ann Arbor, Detroit and East Lansing, Feb. 14-15. Sec., Miss Flora E. Dube, East Lansing.

OKLAHOMA: Oklahoma City, Nov. 18. Sec. of State, Hon. C. C. Childress, State Capitol, Oklahoma City.

RHODE ISLAND: Providence, Nov. 20. Acting Chief, Division of Examiners, Mr. E. Clyde Thomas, 366 State Office Bldg., Providence.

SOUTH DAKOTA: Examination. Yankton, Dec. 6-7. Endorsement. Dec. 21. Sec., Dr. Gregg M. Evans, Yankton.

WASHINGTON: Seattle, Jan. 9-10. Sec., Department of Licenses, Mr. Nelson N. Vaughan, Olympia.

WISCONSIN: Milwaukee, Dec. 7. Sec., Prof. Robert N. Bauer, 3414 W. Wisconsin Ave., Milwaukee.

Georgia June Report

Mr. R. C. Coleman, joint secretary, Georgia State Board of Medical Examiners, reports the written examination for medical licensure held at Atlanta, June 12-13, 1940. The examination covered ten subjects and included 100 questions. An average of 80 per cent was required to pass. Eighty-three candidates were examined, all of whom passed. The following schools were represented:

School	PASSED	Year Grad.	Per Cent
Emory University School of Medicine.....	(1940)	81.7,	
82.3, 82.9, 83.3, 83.4, 83.5, 83.7, 84, 84.1, 84.4, 84.4,			
84.6, 84.6, 84.7, 84.9, 85.2, 85.3, 85.4, 85.4, 85.5, 85.5,			
85.9, 86, 86, 86.2, 86.4, 86.4, 86.6, 86.7, 87, 87.2,			
87.5, 87.5, 87.5, 87.5, 87.6, 87.8, 88.1, 89.4, 89.5, 90,			
90.8, 91.5			
University of Georgia School of Medicine.....	(1940)	80.4, 81.1,	
81.4, 82.7, 82.8, 83.3, 83.4, 83.4, 83.6, 84.3, 84.4, 84.5,			
84.5, 84.6, 84.7, 85, 85, 85.1, 85.1, 85.2, 85.3, 85.6,			
85.7, 86, 86.4, 86.5, 87.1, 87.1, 87.8, 87.9, 88.3, 88.6			
Northwestern University Medical School.....	(1940)	86.7	
Rush Medical College.....	(1917)	81.3	
Tulane University of Louisiana School of Medicine.....	(1940)	89.4	
Harvard Medical School.....	(1940)	88.1	
Cornell University Medical College.....	(1940)	86	
New York University College of Medicine.....	(1940)	83.2	
University of Pennsylvania School of Medicine.....	(1925)	83.2	

Twenty-three physicians were successful in the practical examination for reciprocity and endorsement applicants on June 13 and July 12. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
George Washington University Sch			
Georgetown University School of			
Emory University School of Med			
Rush Medical College.....	(1930)		
University of Kansas School of Medicine.....	(1934)		Kansas
University of Louisville School of Medicine.....	(1938)		Kentucky
Louisiana State University School of Medicine.....	(1939)		Louisiana
Tulane University of Louisiana School of Medicine.....	(1936),		
(1938) Louisiana			
Johns Hopkins University School of Medicine.....	(1934, 2)		Maryland
University of Maryland School of Medicine and Col-			
lege of Physicians and Surgeons.....	(1939)		N. Carolina
University of Minnesota Medical School.....	(1930)*		Minnesota
Medical College of the State of South Carolina.....	(1931)		S. Carolina
Meharry Medical College.....	(1935)		Tennessee
University of Nashville Medical Department.....	(1899)		Tennessee
University of Tennessee College of Medicine.....	(1929)		Tennessee
Baylor University College of Medicine.....	(1921)		Texas
Medical College of Virginia.....	(1927)		Virginia,
(1931), (1935) North Carolina			

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
New York University College of Medicine.....	(1937)	N. B. M. Ex.	

* License has not been issued.

Ohio Reciprocity Report

Dr. H. M. Platter, secretary, Ohio State Medical Board, reports thirty-four physicians licensed to practice medicine by reciprocity and three physicians so licensed by endorsement on July 2. The following schools were represented:

School	LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
University of Arkansas School of Medicine.....	(1938)		Arkansas
University of Colorado School of Medicine.....	(1925)		Colorado
The School of Medicine of the Division of the Bio-			
logical Sciences.....	(1933)		Mass.
University of Illinois College of Medicine.....	(1937)		Illinois
Indiana University School of Medicine.....	(1939, 2)		Indiana
State University of Iowa College of Medicine.....	(1936)		Iowa
University of Kansas School of Medicine.....	(1936), (1939)		Kansas
University of Louisville School of Medicine.....	(1930),		
(1937), (1939) Kentucky			
University of Maryland School of Medicine and Col-			
lege of Physicians and Surgeons.....	(1935)		Penna.
Tufts College Medical School.....	(1937)		Mass.
University of Michigan Medical School.....	(1933), (1936)		Michigan
University of Michigan College of Medicine.....	(1937), (1938)		Michigan
University of Minnesota Medical School.....	(1936)		Minnesota
University of Missouri School of Medicine.....	(1936),		
(1937) Missouri			
Washington University School of Medicine.....	(1936), (1938)		Missouri
University of Nebraska College of Medicine.....	(1924), (1937)		Nebraska
Columbia University College of Physicians and Sur-			
geons.....	(1937)		New York
Hahnemann Medical College and Hospital of Phila-			
delphia.....	(1937)		Penna.
Meharry Medical College.....	(1939)		Tennessee
Vanderbilt University School of Medicine.....	(1937)		Tennessee
University of Virginia Department of Medicine.....	(1938)		Virginia
Marquette University School of Medicine.....	(1931)		Wisconsin
University of Toronto Faculty of Medicine.....	(1936)		Missouri

School	LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
Northwestern University Medical School.....	(1937)	N. B. M. Ex.	
Harvard Medical School.....	(1938)	N. B. M. Ex.	
Duke University School of Medicine.....	(1937)	N. B. M. Ex.	

Book Notices

Applied Pharmacology. By Hugh Alister McGulgan, Ph.D., M.D., F.A.C.P., Professor of Pharmacology and Therapeutics, University of Illinois College of Medicine, Chicago. Cloth. Price, \$9. Pp. 914, with 41 illustrations. St. Louis: C. V. Mosby Company, 1940.

There is need for additional textbooks in the field of pharmacology, and especially for textbooks that correlate clinical procedures with the data from the experimental laboratory; consequently this book will be received with more than ordinary interest. The attempt has been made to develop the subject in relation to physiology and biochemistry on the one hand and to its application to therapy on the other. The author has been successful in combining in a single book the two approaches which have been separately employed in other textbooks: the pharmacology of organs and systems is first presented from a functional point of view and this is followed by a section treating in detail the various drugs the action of which is associated most prominently with that system, including a treatment of its therapeutic applications. This is an ambitious program and it is perhaps inevitable that much had to be sacrificed in the attempt to squeeze into 900 pages subject matter of such broad scope: a difficulty inherent in any attempts to present a comprehensive description of pharmacology and its applications. Physiology is a large field and, while the subject is tersely summarized, this fact inevitably gives it a dogmatic character. Presumably the author's point of view is adequately represented, but the subject is one in which there is room for considerable diversity of opinion. Antiquated theories are given undue prominence and in many instances the material is not logically presented, nor is it free from errors.

The attempt to correlate the content of experimental pharmacology with its application to therapeutics is an even more difficult matter, and despite the aims set forth in the preface the author appears not to have carried this further than others have done in the standard textbooks of pharmacology. Few pharmacologists would agree with the introductory statement "While pharmacological knowledge is based largely on experiments made on laboratory animals, there is not the slightest reason for such study unless something is gained that can be carried over to aid in the treatment of a sick patient." Without clinical use in view, pharmacology becomes but a morbid curiosity." Without minimizing the importance of the applications of pharmacology, it can be confidently stated that its contributions give it a secure position among the pure sciences.

The content of pharmacology as usually taught in our medical schools is covered completely, and there are included chapters on the hormones, the vitamins and prescription writing. The newer drugs in general receive adequate treatment. There are, however, a few omissions, notably acetylcholine, which is only incidentally mentioned in connection with its functional role, and there is no discussion of its important derivatives. While for the reasons indicated this book will not find universal favor in connection with the requirements of medical school teaching, it has a fresh approach to various problems in pharmacology and will be read with interest and profit by many seeking to broaden their knowledge of pharmacology.

An Experiment in Responsible Learning: A Report to the Carnegie Foundation on Projects in Evaluation of Secondary School Progress 1929-1938. By William S. Learned, Staff Member, Carnegie Foundation for the Advancement of Teaching, and Anna L. Rose Hawkes, Staff Assistant for the Pennsylvania Inquiry. With a foreword by Walter A. Jessup, President of the Foundation. Study of the Relations of Secondary and Higher Education in Pennsylvania. Bulletin Number 31. Paper. Pp. 61. New York: Carnegie Foundation for the Advancement of Teaching, 1940.

A part of the foundation's study of the relations of secondary and higher education in Pennsylvania, this experiment had the purpose, in the words of President Jessup, "to discover and measure the durable intellectual capital of young students—those live resources they are sure of and able to use." The real job however, he declares, "is to make clear to the young person that genuine self education is not merely going through college—that it is both a simpler and a far more serious business. The school and college can help, but the student must first learn that he stands alone and that his education is within him."

In the course of its inquiry the foundation discovered that the essential features of its proposed investigation could be achieved only if the old credit structure was eliminated and in its place an entirely new educational program set up. Such a program, voluntarily adopted by three high schools, substituted for the customary "courses" and "credits" a procedure designed to keep the pupil constantly aware that the real object of education is (1) to understand as the result of knowledge and (2) to apply understanding effectively. Briefly, the experiment required that a selected teacher in any field, such as English, be given responsibility for directing all the English study of a certain group throughout a three year period and was empowered to formulate the entire program in his particular field. Grades having been discarded, emphasis was laid on the one factor essential for education, namely understanding and understanding how to use. Under this plan the role of the teacher is radically changed. Instead of repeating, each semester, the same courses to successive classes, the individual members of which he can never know well, he has an opportunity to observe his pupils, study their reactions and develop for each a long range program best adapted to evoke his active cooperation in the process of learning and to expand and mature his capabilities. Under such conditions how may the student's progress be measured? Could examinations be devised which would with reasonable accuracy test the amount of profitable thinking done, ideas mastered and working knowledge retained? Comprehensive examinations were available and, although designed for college use, proved fairly successful and surprisingly suggestive. The ultimate criterion of the success of the experiment was held to be the eventual performance of the pupil in college. The number participating may have been too small to justify sweeping conclusions as to the achievement of the group, but no one can doubt the significance of this attempt to bring home to the student of high school age a sense of responsibility for his own education.

Malaria and Colonization in the Carolina Low Country 1526-1696. By St. Julien Ravenel Childs, Department of History, Brooklyn College, Brooklyn. The Johns Hopkins University Studies in Historical and Political Science under the direction of the Departments of History, Political Economy, and Political Science, Series LVIII, Number 1. Paper. Price, \$2.50. Pp. 292. Baltimore: Johns Hopkins Press, 1940.

The author defines the Carolina Low Country as the coastal area extending from peninsular Florida to Cape Hatteras. As a whole this area is not particularly fertile and is poor in mineral wealth. It is in the limited areas suitable for agriculture that malaria is prevalent today and was so virulent in former times. Continuous occupation by people of European stock nowhere dates further back than 1670, when the English settled at Ashley River near the present site of Charleston.

The monograph is divided into seven chapters. The first is introductory and considers the natural history of the malarial parasite and the relation of malaria to colonization in general. Chapters 2 and 3 are devoted to the earlier colonies which failed but which have valuable implications in relation to malaria and the Ashley River settlement. After careful consideration of the various attempts of Ponce de Leon, de Ayllon, de Luna, Valla-faïe, Ribaut and Laudonnière to establish colonies from 1526 to 1565, the author concludes that parasitic and infectious diseases were of importance only to the followers of de Ayllon and that even his attempt would not have succeeded in the absence of malaria. Similar consideration is given the various Spanish posts in Florida during the series of costly conquests between 1565 and 1580. The author reasons logically that the evidence indicates that European settlement of the Low Country was not necessarily attended by severe epidemics of malaria.

The major portion of the monograph, chapters 4-7, deals with the English colony at Ashley River. The specific topics considered are the peopling of Ashley River, 1670-1677, public health at Ashley River, 1670-1677, the promotion of immigration, 1678-1684, and the triumph and decline of malaria, 1682-1696. In drawing conclusions on the effect of malaria on this colony from its founding to 1696 the author considers in great detail the possible infection of immigrants, the virulence of the malarial parasite in localities from which the immigrants came, the presence and virulence of malarial infections in colonists and, finally, the probable effect of malaria on the history of the colony. He points out that the actual timing of some specific historical facts is unimportant. Thus the naturalization of

malaria would have followed shortly after the opening of the African trade even if it had not occurred between 1678 and 1696. The author stresses the inability of the malaria parasites to determine social history. He believes that such facts as the introduction of the malarious industry rice growing into a region already malarious reveals a surprising feebleness in the disease when pitted against man's economic desires. He does not believe that even the virulent Low Country malaria of the eighteenth century exercised a profound influence on society. Impotence to determine social patterns is implied by the similarity of malarious South Carolina and Jamaica to malaria-free Barbados. "Men being mortal, none save in fable and miracle has successfully denied that disease is mighty over the individual, but society being immortal, it is permissible to believe that parasites and viruses have played an unimportant role in social history. When the medicine man resumes the pose of prophet, it is well to recall that man's worst enemy has never been a bug."

The author is a historian and not a malarialogist, but the references to the literature and the judgments regarding malaria indicate a wide acquaintance with the recent literature on the disease. All historical considerations of malaria leave much to be desired in the question of exact diagnosis. The present author has, contrasted with some earlier writers on the historical aspects of malaria, shown a healthy skepticism regarding many reports. In general one feels that his conclusions, although necessarily not based on decisive data, are probably sound. The book is an interesting and noteworthy contribution to the history of malaria. The bibliographic documentation is especially detailed.

Manual of Medical and Surgical Emergencies. Edited by J. C. Geiger, M.D., Director, Department of Public Health, City and County of San Francisco, California. Cloth. Price, \$2.50. Pp. 199. San Francisco: J. W. Stacey, Inc., 1940.

More than fifty surgeons and physicians who are or who have been connected with the San Francisco Emergency Hospital have collaborated under Dr. Geiger's editorship in the preparation of this unusually valuable manual. The subject matter covers the wide range of conditions which may be encountered in an emergency hospital and includes all manner of surgical and medical emergencies. The manual will be an extremely practical and valuable guide to all who serve in emergency rooms. Detailed instructions are given, including the advice to apply to the completed bandage a stamp which reads "Consult your family doctor at once." The section on the care of fresh wounds is particularly good, but so are practically all the other sections. The commercial citrate flasks for blood transfusions should have been mentioned, and the consideration of vitamin deficiency, though excellent, could be omitted. Dr. Geiger is to be congratulated on his editorship of this authentic, time-saving manual.

Science and Everyday Life. By J. B. S. Haldane, F.R.S., Professor of Biometry in the University of London, London. Cloth. Price, \$2. Pp. 284. New York: Macmillan Company, 1940.

This volume consists of a series of articles written by the author for various publications, mostly addressed to the public. They appeared in England in the *Daily Worker* as a series of columns. The articles are divided into eleven chapters dealing with food, bad air, general science, drugs, heredity and social-medical relationships. Dr. Haldane writes beautifully and he is intelligible to every intelligent reader. He seems still to be seriously impressed by the Russian experiment. Presumably the *Daily Worker* in Great Britain is a facsimile of the one which has been inflicted on Americans in recent years. Dr. Haldane admits frankly his belief in the doctrines of Marx and it is interesting to see how even medical science can become unscientific when one wishes to promote a doctrine rather than scientific fact. Professor Haldane is himself a thinker and, of course, makes every reader think. His comment on the case of elixir of sulfanilamide is amusing. He says "The company said they did not know ethylene glycol was a poison. So, as the stuff had been sold in the sacred cause of profit, no one was electrocuted or even imprisoned. The gangsters must have felt very sore about it, considering the fuss made when one of them bumps off even half a dozen people." Especially significant is his chapter on racial doctrines and his outline of the organization of British science.

Pathogenic Anaerobic Organisms of the Actinomyces Group. By Dagny Erikson. Medical Research Council Special Report Series, No. 240. Paper. Price, 1s. Pp. 63, with illustrations. London: His Majesty's Stationery Office, 1940.

In 1935 a report (No. 203) was issued of Miss Erikson's study of aerobic types of Actinomyces. The present report deals with results of her study of anaerobic organisms of that group. The study covers twenty anaerobic or micro-aerophilic Actinomyces strains, fifteen being of human and five of bovine origin. The bovine strains (Actinomyces bovis) were found to be essentially identical and different from the human strains, which also form one group with only minor variations. Miss Erikson's human type corresponds to the original Wolff-Israel type (Actinomyces israeli) and to the majority of reported strains of human origin. The report will be of much value to future workers on the etiology of actinomycotic diseases. It is important that new cultures of Actinomyces be submitted to some permanent collection for identification and preservation for further study.

The Bacteriology of Public Health. By George M. Cameron, Ph.D., Associate Professor of Bacteriology, University of Tennessee, Memphis. Cloth. Price, \$3.50. Pp. 451, with 43 illustrations. St. Louis: C. V. Mosby Company, 1940.

This textbook is elementary and deals principally with pathogenic bacteria. The term "ptomaine," which has been discarded as meaningless by the chemist and students of food poisoning, is still used in this book. The author refers to it in chapter 2, on the development of knowledge, in chapter 3, on the sources of the microbial flora of the alimentary canal, and in chapter 6, on food idiosyncrasies, food poisoning and food infections. The author is unorthodox in his evaluation of antiseptics for the mouth and of x-ray examination in determining the activity of tuberculous lesions. In chapter 3, under his discussion of micro-organisms in the mouth, he states that "the importance of clean teeth and the use of good antiseptics in the mouth cannot be overemphasized." In chapter 15, on tuberculosis, he states that "x-ray pictures are important in determining the extent of tuberculous lesions in the patient, but they give no information as to the activity of such cases." The book might appeal to the layman, but it cannot be recommended to the medical profession.

La fotografia del estomago. Por José P. Uslenghi, Herbert Hofmann y Joseph Heilpern. Paper. Pp. 215, with 275 illustrations. Buenos Aires: Aniceto Lopez, 1939.

This is a revised edition of the book of Herbert Hofmann which appeared in 1936 and was reviewed in THE JOURNAL Sept. 12, 1936, page 903. Although the size of the volume has been increased considerably, the only important difference is the addition of a plate with a colored gastrophotograph made through the Heilpern gastrophotor. If one opens a new volume on gastrophotography one always hopes to find a report of definite progress; but, again, no such progress can be noted. Only a few of the photographs of the interior of the stomach show some similarity to corresponding gastroscopic pictures or to photographs made through the gastroscope (figs. 146, 148, 154 and 253). All the other illustrations are full of artefacts and their interpretation is inadequate. This disappointing volume merely demonstrates of what little use the method of blind gastrophotography is at the present time.

Sulfanilamide, Sulfapyridine and Allied Compounds in Infections. By Maurice A. Schnitzer, M.D., Associate Attending Physician, Toledo Hospital, Toledo. Edited by Henry A. Christian, A.M., M.D., LL.D. [Reprinted from Oxford Loose-Leaf Medicine.] Cloth. Price, \$1.50. Pp. 72. New York, Toronto & London: Oxford University Press, 1940.

In the foreword of this book it is stated that the physician needs a book to turn to to find authoritative statements about the therapeutic utility of the sulfonamides which will aid him as a guide in the use of these preparations. This purpose, unfortunately, is not satisfactorily accomplished. A brief introductory section on the pharmacology of sulfanilamide is not well organized, is quite superficial and devotes a fourth of its content to the relatively unimportant question of the excretion of sulfanilamide in the breast milk of lactating women. The paragraphs on methods of administration and dosage are unnecessarily cumbersome and confusing. The stated indications for the use of large, moderate and small doses would in practice need to be modified frequently and sometimes are contradicted elsewhere in the text. For example, puerperal

sepsis is included among the conditions requiring only moderate doses, while in a later paragraph dealing with the treatment of this condition it is suggested that the best results may be obtained by maintaining steadily a blood concentration of from 10 to 15 mg. per hundred cubic centimeters. Similarly the section dealing with infections in which sulfanilamide is effective often suffers because of apparent contradictions; e. g., in discussing the treatment of infections of the urinary tract the author speaks of "the probability that the concentration in the blood stream is more important in overcoming the infection than is the concentration in the urine" only to follow this in a subsequent paragraph with the suggestion "that with a given organism a certain level of free sulfanilamide must be maintained in the urine in order to obtain the best results." The statement that combined serum and sulfanilamide should be used in meningococcic meningitis is not in agreement with most current opinion nor does it seem profitable to describe the use of sulfanilamide in pneumococcic pneumonia immediately following the statement that sulfapyridine has supplanted sulfanilamide in the treatment of this disease. The section on the toxic manifestations of sulfonamide therapy is fairly comprehensive but the text is lacking in clarity and, like the book as a whole, leaves the reader more confused than instructed.

Dermatology and Syphilology for Nurses Including Social Hygiene. By John H. Stokes, M.D., Professor of Dermatology and Syphilology, the School of Medicine, University of Pennsylvania, Philadelphia. Third edition. Cloth. Price, \$2.75. Pp. 365, with 74 illustrations. Philadelphia & London: W. B. Saunders Company, 1940.

In this edition the author has given the text a careful revision and included the most recent additions to dermatotherapy. The section on venereal diseases has been increased in scope. Fever therapy and sulfanilamide treatment in various diseases are fully covered. This book remains the standard textbook for nurses in the field of dermatology and syphilology.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Privileged Communications: Privilege Applicable Only to Judicial Proceedings—Not to Legislative Investigations.—The City Council of the City of New York appointed a committee to inquire into charges of negligence and malpractice in the treatment of patients at a certain city hospital. Subpoenas duces tecum were served on the Commissioner of Hospitals of New York City and on the medical superintendent of the hospital involved, each of whom appeared before the committee but refused to "produce any papers or documents relating to complaints made by any one with respect to any of the internes, clinic physicians or visiting staff . . . or with respect to medical or other treatment or service furnished in the wards or clinics of the hospital containing data relating to the condition of the patients or to the medical or other treatment or service furnished to them." They based their refusal on section 352 of the Civil Practice Act of New York, which provides, in part, as follows:

"a person duly authorized to practice physic or surgery, or a professional or registered nurse, shall not be allowed to disclose any information which he acquired in attending a patient in a professional capacity, and which was necessary to enable him to act in that capacity.

The committee then instituted appropriate proceedings before the supreme court, special term, New York county, to require the commissioner and the medical superintendent to produce the books and records called for by the subpoenas or be punished for contempt of court.

The sole question to be determined concerned the right of the two defendants, by virtue of the privileged communications statute quoted, to refuse to produce the hospital records. At common law, said the supreme court, information acquired by physicians or nurses in the treatment of patients was not

privileged and a disclosure of both the patient's condition and the treatment given him could be compelled. Only to the extent that the situation existing at common law has been changed by statute are communications between physician and patient now privileged. The only statute which purports to create such a privilege is section 352 quoted above. That section, however, it has been held, applies only to judicial proceedings and does not create a privilege for all purposes and under all conditions. As was said by the Court of Appeals of New York in *Buffalo Loan, Trust & Safe-Deposit Co. v. Knights Templar & Masonic Mut. Aid Ass'n*, 126 N. Y. 450, 27 N. E. 942, 22 Am. St. Rep. 839:

The primary purpose of the section was to declare the rule governing the examination of a physician as a witness in judicial proceedings . . . [Section 354 of the Civil Practice Act declares that the section creating the privilege with respect to clergymen, physicians, and attorneys applies] to every examination of a person as a witness, unless the provisions thereof are expressly waived by a person confessing the patient or the client. The disclosure by a physician of information acquired in his professional character in attending a patient, where not made in the course of his professional duty, is a plain violation of professional propriety. But the statute does not prescribe a rule of professional conduct for the government of physicians in their general intercourse with society. The common law did not protect a physician from disclosing as a witness information acquired professionally from patients. . . . The statute was intended to afford this protection, and to protect the patient also. If a physician, disregarding the plain obligations of his situation, should in conversation disclose the secrets of his patient, he would, so far as we know, violate no statute, however reprehensible his conduct would be. The statute should have a broad and liberal construction, to carry out its policy. By reasonable construction it excludes a physician from giving testimony in a judicial proceeding in any form, whether by affidavit or on oral examination, involving a disclosure of confidential information acquired in attending a patient, unless the seal of secrecy is removed by the patient himself.

Confirmation of the fact that the privileged communication statute, continued the supreme court, was intended to apply only to judicial proceedings is to be found in the fact that the only provision permitting a waiver of the privilege states that the waiver "must be made in open court, on the trial of the action or proceeding, and a paper executed by a party prior to the trial providing for such waiver shall be insufficient as such a waiver." (Civil Practice Act, Section 354.)

This court, continued the supreme court, accordingly holds that the privilege in question does not apply to legislative investigations. To uphold the claim of privilege would make it impossible for the city's legislative body to examine into the serious charges made with respect to the administration of the hospital in question. Incompetence and malpractice, with great harm and danger to the public, might thus be permitted to continue while the city's legislative body remained powerless to ascertain the facts and take appropriate action. There is not the slightest evidence that the legislature in enacting the privileged communication statute ever intended to extend its scope so as to produce such a situation. If the hospital authorities are permitted access to the confidential data relating to the treatment of patients, there appears to be no good reason for withholding them from the city council, which, in effect, is the legal superior of the hospital authorities.

Accordingly, the court directed the defendants to produce all the books and records which they had declined to produce and directed further that, in the event of their failure to obey, a warrant for their commitment to jail be issued.—*In re Lincoln Hospital, Bronx* (N. Y.), 20 N. Y. S. (2d) 712.

Right of Osteopaths to Prescribe and Dispense Narcotics in Georgia.—The Georgia Association of Osteopathic Physicians & Surgeons, Incorporated, and certain osteopaths brought an action in the District Court of the United States for the middle district of Georgia to restrain the Collector of Internal Revenue of the United States in the State of Georgia from refusing to permit osteopaths licensed to practice in Georgia to register under the Harrison Narcotic Act. The trial court entered a judgment for the collector (31 F. Supp. 206) and the plaintiffs appealed to the United States circuit court of appeals, fifth circuit.

A collector of internal revenue, said the circuit court of appeals, has no discretion in permitting or refusing to permit an applicant to register under the Harrison Narcotic Act. If under the laws of the state in which the applicant is licensed

to practice the healing art he is authorized to use narcotic drugs in connection with his practice, the collector must permit him to register; if those laws do not authorize the applicant to use narcotic drugs, the collector cannot permit the applicant to register. The determining question then is whether or not under the laws of Georgia a person licensed to practice osteopathy in Georgia has the right to use narcotic drugs in connection with his practice.

Two laws regulating the possession and distribution of narcotic drugs are apparently in force in Georgia. One of those laws (Georgia Code Ann., Sec. 42-704), enacted in 1907, forbids the sale of narcotics, except on the written order or prescription of a lawfully authorized practitioner of medicine, dentistry or veterinary medicine. Another law (Georgia Code Ann., Sec. 42-802 et seq.), enacted in 1935, provides that narcotic drugs can be sold to a physician, dentist or veterinarian, or by an apothecary on a written prescription of a physician, dentist or veterinarian. The latter law defines a physician to be a person authorized by law to practice medicine in the state, and any other person authorized by law to treat sick and injured human beings in Georgia and to use narcotic drugs in connection with such treatment. The plaintiffs contended that they are "practitioners of medicine" within the meaning of the 1907 law and "physicians" within the meaning of the 1935 law, and that under either classification they are entitled to prescribe and administer narcotic drugs in connection with their practice. They cited the fact that osteopaths had always been registered and licensed to dispense drugs in Georgia prior to the acts which gave rise to the instant suit. They further argued that their licenses authorize the practice of osteopathy "as taught and practiced in the legally incorporated and reputable colleges of osteopathy" (Georgia Code Ann., Sec. 84-1209, enacted in 1909), and that the use of narcotic drugs and other drugs is an integral and essential part of their professional work as so taught and practiced. But, answered the circuit court of appeals, the controlling Georgia statutes do not expressly include osteopaths among those legally empowered to dispense and administer narcotic drugs. We think it is clear that the Georgia legislature did not intend to authorize osteopaths to use narcotic drugs in their practice.

Webster's New International Dictionary, continued the court, defines osteopathy to be a system of treatment based on the theory that diseases are chiefly due to deranged mechanism of the bones, nerves, blood vessels and other tissues and can be remedied by manipulation of these parts. In enacting the Georgia osteopathic practice act and the various amendments thereto the Georgia legislature has repeatedly classified osteopathy as "a non-drug-giving school of medical practice" (Georgia Acts of 1916, Sections 84-9918, 84-9919; Georgia Code Ann., Sec. 84-906). In *Bennett v. Ware*, 4 Ga. App. 293, 61 S. E. 546, the court of appeals of Georgia in 1908 interpreted the phrase "practice of medicine," as used in the narcotic drug act enacted in 1907, to mean prescribing or administering drugs or medicinal substances, or as relating to those means and methods of treatment for prevention of disease taught in medical colleges and practiced by medical practitioners. The court in that case classified osteopaths as being among those who "eschew the practice of medicine altogether." One year later, in 1909, the Georgia legislature first officially recognized the practice of osteopathy by providing for the licensing of osteopaths. It is apparent, therefore, that an osteopath was not a physician or practitioner of medicine within the general acceptance of that term, or within the contemplation of the Georgia legislature, when the statutes in question were enacted. Furthermore, it conclusively appears that the accepted meaning of the term "osteopathy," from the beginning of the school of osteopathy in 1874 and far beyond 1909, the year in which the osteopathic practice act was enacted and the date which is controlling in this case, contemplated a drugless school of medicine. In fact, an examination of the history of the osteopathic school indicates that osteopathy is the very antithesis of any science of medicine involving the use of drugs.

The court concluded, therefore, that a licensed osteopath is not authorized under the laws of Georgia to use narcotic drugs in connection with his practice. Accordingly, the court held

that the action of the trial court in dismissing the suit to require the collector to permit osteopaths to register under the Harrison Narcotic Act was proper, and so it affirmed the trial court's judgment of dismissal.—*Georgia Ass'n of Osteopathic Physicians & Surgeons, Inc., et al. v. Allen, Collector of Internal Revenue*, 112 F. (2d) 52.

Compensation of Physicians: "Expenses of the last illness" Construed.—The General Code of Ohio, section 10509-121, requires an executor or administrator to pay, out of the estate, the debts of a deceased in the following order:

1. Bill of funeral director not exceeding three hundred fifty dollars, such other funeral expenses as are approved by the court, the expenses of the last sickness and those of administration.

The plaintiff physician began to treat the deceased for cancer on March 1, 1935. The treatments administered by him were at irregular intervals, there being no treatments rendered from Aug. 12, 1935, to July 6, 1936, and periods during which the deceased was regularly employed were interspersed. He continued to treat the deceased until Nov. 14, 1936, after which time she was treated at her home by another physician, apparently for the reason that the plaintiff gave treatments for cancer only in his office or at a hospital. The deceased died as the result of the cancer on March 27, 1937. The administratrix of the deceased's estate refused to recognize the plaintiff's bill for his services as a preferred indebtedness of the deceased. The plaintiff then filed exceptions in the probate court, which exceptions were upheld. From a judgment of the court of common pleas affirming the judgment of the probate court and holding that the plaintiff's claim was an expense of the deceased's last sickness and therefore a preferred indebtedness, the administratrix appealed to the court of appeals of Ohio, Lucas County.

The court of appeals held that the plaintiff's bill for the medical services rendered by him to the deceased could not be considered an expense of the deceased's last sickness. If it were such an expense then any treatment of an incurable disease, no matter how long before the death of the patient the treatment was given, could be construed as an expense of the last illness of the deceased. In so holding the court relied indirectly on the case of *Proto, Adm'r, v. Chenoweth*, 40 Ariz. 312, 11 P. (2d) 950, in which the Supreme Court of Arizona in construing a similar claim said:

It seems to us that the reasonable meaning of the phrase precludes, or should preclude, a physician from making claim to a preference, even though his treatment was for the same disease of which the patient finally died, if and when his services are not continuous, but occasional, with long intervals of discontinuance unexplained, and especially when the patient at the time of his death has severed the relation and employed another to look after him.

Accordingly, the court of appeals reversed the judgment in favor of the plaintiff and disallowed his claim to preferment.—*Murphy v. Langa (Ohio)*, 23 N. E. (2d) 516.

Society Proceedings

COMING MEETINGS

- American Academy of Pediatrics, Memphis, Tenn., Nov. 18-20. Dr. Clifford G. Grulee, 636 Church Street, Evanston, Ill., Secretary.
- American Society of Anesthetists, New York, Dec. 12. Dr. Paul M. Wood, 745 Fifth Ave., New York, Secretary.
- American Society of Tropical Medicine, Louisville, Ky., Nov. 12-15. Dr. E. Harold Hinman, Malaria Control Division, Wilson Dam, Ala., Secretary.
- American Student Health Association, Ann Arbor, Mich., Dec. 27-28. Dr. Ralph I. Canuetson, University of Kansas, Lawrence, Kan., Secretary.
- Puerto Rico, Medical Association of, San Juan, Dec. 13-15. Dr. David E. Garcia, P. O. Box 3866, Santurce, Secretary.
- Radiological Society of North America, Cleveland, Dec. 2-6. Dr. Donald S. Childs, 607 Medical Arts Bldg., Syracuse, N. Y., Secretary.
- Society of American Bacteriologists, St. Louis, Dec. 27-29. Dr. I. L. Baldwin, Agricultural Hall, University of Wisconsin, Madison, Wis., Secretary.
- Southern Medical Association, Louisville, Ky., Nov. 12-15. Mr. C. P. Loranz, Empire Bldg., Birmingham, Ala., Secretary.
- Loranz, Empire Bldg., Birmingham, Ala., Secretary.
- Southern Surgical Association, Hot Springs, Va., Dec. 10-12. Dr. E. Alton Ochsner, 1430 Tulane Ave., New Orleans, Secretary.
- Southwestern Medical Association, Tucson, Ariz., Nov. 21-23. Dr. M. P. Spearman, 1001 First National Bank Bldg., El Paso, Texas, Secretary.
- Western Surgical Association, Topeka, Kan., Dec. 6-7. Dr. Albert H. Montgomery, 122 South Michigan Blvd., Chicago, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Clinical Pathology, Baltimore 10:593-672 (Sept.) 1940

- *Positive Friedman Tests in Nonpregnant States. E. P. McCullagh and W. K. Cuyler, Cleveland.—p. 593.
Carbon Monoxide Content of Blood Under Various Conditions. A. O. Gettler and H. C. Freimuth, New York.—p. 603.
*Analysis of Hippuric Acid, Galactose Tolerance, Bromsulphalein and Prothrombin Tests in 381 Cases. C. J. DeLor and H. L. Reinhart, Columbus, Ohio.—p. 617.
Rare Forms of Primary Malignant Lung Tumors: Report of Three Types. A. R. Casilli, Elizabeth, N. J., and H. J. White, Metuchen, N. J.—p. 623.
Diagnostic Significance of Eosinophilia in Periarthritis Nodosa. J. Lebowich and H. D. Hunt, Saratoga Springs, N. Y.—p. 642.
Actinomycosis: Review of Subject with Detailed Clinical and Autopsy Reports of One Case Each of Intestinal and Ovarian Forms. L. S. Auster, New York.—p. 652.

Positive Friedman Tests in Nonpregnant States.—McCullagh and Cuyler emphasize the fact that a variety of conditions other than pregnancy may be associated with the excretion of sufficient gonadotropic substance to produce a positive Friedman reaction. They obtained 241 positive Friedman tests in 2,134 cases in which neither pregnancy nor evidence of chorionic tissue was present. Of 1,774 tests in women 172 yielded positive reactions, and of 360 tests in men sixty-nine yielded positive reactions. The authors emphasize that in considering the positive reactions in these cases it should be remembered that all tests were done on persons suspected not of pregnancy but of some endocrine abnormality, and the frequency of positive results is thus not comparable to the so-called false positives found in cases in which the test was done for suspected pregnancy. They do not want to imply that this test is not of extremely high value in the diagnosis of pregnancy but rather to point out that, when used as it has been here, its value may be extended and, in addition, positive reactions which may in the past have been misleading may be better anticipated and more accurately interpreted. The test is made on adult female rabbits. The patient is instructed to restrict the fluid intake after 4 o'clock in the afternoon to one glass of water at the evening meal and none thereafter until the rising specimen of urine is collected, which is used for the test. Four cc. of urine is injected into the ear vein of the rabbit on each of three occasions daily for two successive days and the abdomen is opened under ether anesthesia on the morning of the third day. The following observations are considered to constitute a positive reaction: (1) freshly ruptured graafian follicles, (2) hemorrhagic follicles or (3) fresh corpora lutea. For purposes of analysis the authors divide cases showing positive Friedman reactions into several groups: conditions associated with disorders peculiar to women, conditions associated with or due to testicular deficiency or tumor, endocrine disorders that are not sex specific, disorders of the nervous system and of the pituitary and conditions not clearly endocrine in nature. They emphasize that the test is frequently positive about the time of puberty, possibly for physiologic reasons. It may be positive in psychoses, hysteria, epilepsy and arterial hypertension in the absence of gonadal failure and may be useful in the differential diagnosis of pituitary cachexia and anorexia nervosa. Primary disease of the pituitary such as acromegaly or pituitary tumor and also organic lesions in the hypothalamus may cause positive reactions. In cases of dwarfism and in some cases of obesity, such as are usually designated Fröhlich's syndrome, positive reactions have occurred suggesting that the gonadal failure present could not be due to deficiency of gonadotropic hormone pro-

duction and must be secondary to other causes. Positive tests may be present in hyperthyroidism, diabetes mellitus and adrenal cortex hyperfunction either of the functional type or in cases of adrenal cortex tumor. Gonadal damage in either sex may cause a positive test; thus positive reactions are frequent at the menopause and in women with functional ovarian deficiency, ovarian tumors or inflammation. Positive reactions are also seen in men with testicular deficiency, cryptorchism and prostatic hypertrophy. Positive tests have been found also in alopecia areata and in cases of progressive myopia and keratoconus.

Analysis of Tests of Hepatic Function.—DeLor and Reinhart state that, following the publication of Quick's hippuric acid liver function test in 1933, they began its use as a routine examination in suspected liver disease along with the galactose tolerance test and the bromsulphalein test, and more recently they added the determination of the blood prothrombin. These tests were instituted as a preoperative routine in various types of gallbladder disease because of the frequently associated liver disease. Selected liver function tests were also conducted in a group of other diseases, but only in those cases in which there was reason to suspect impairment of liver function. Early in the course of the investigations it became apparent that severe grades of liver damage may be recognized by any of the tests, irrespective of the inherent sensitivity of the test. But, in cases in which liver function was moderately or slightly impaired, few of the tests indicated any evidence of functional impairment. In general it may be said that some evidence of impaired liver function may be obtained in hepatitis, cholecystitis, hyperthyroidism, severe burns, intoxications (drugs, anesthetics, poisons), general acute infections, traumatic injuries of the abdomen with general acute infections, traumatic injuries of the abdomen with contusion of the liver, malignant growths both primary and metastatic, leukemias with hepatic infiltration, some types of anemia, and in debilitating, emaciating diseases, with some or all of the tests used in this series. The authors present the results of the various tests in a table. Their experiences with 381 cases convinced them that normal liver function tests do not exclude the presence of hepatic disease. The hippuric acid, bromsulphalein, serum, bilirubin, blood prothrombin and total blood cholesterol roughly parallel one another as liver function is diminished. The galactose tolerance test is the least reliable test in this study. The bromsulphalein is the most sensitive test for the identification of early liver damage. If two or more of the liver function tests are low, the mortality and morbidity percentage is greater, and as yet no single liver function test furnishes as reliable a prognosis as that which may be derived from two or more tests. The mortality mounts rapidly in cases with 50 per cent or more diminution of liver function as estimated by the foregoing methods.

American Journal of Public Health, New York 30:1023-1158 (Sept.) 1940

- An "American" Health Program. D. B. Armstrong, New York, and W. P. Shepard, San Francisco.—p. 1023.
Criteria for Evaluation of Printed Matter. P. S. Broughton, New York.—p. 1027.
Brilliant Green Lactose Bile and Standard Methods Completed Test in Isolation of Coliform Organisms: Comparative Study. C. B. Kelly, Freeport, N. Y.—p. 1034.
Influence of Organic Acids, Sugars and Sodium Chloride on Strains of Food Poisoning Staphylococci. T. D. Nunheimer and F. W. Fabian, East Lansing, Mich.—p. 1040.
Observations on Durability of Mottled Teeth. Margaret Cammack Smith and H. V. Smith, Tucson, Ariz.—p. 1050.
Personnel Administration Under Civil Service. G. T. Palmer, New York.—p. 1053.
Coliform Bacteria and Streptococci in Swimming Pool Water. R. L. France and J. E. Fuller, Amherst, Mass.—p. 1059.
Vapors and Their Routine Measurement. P. Drinker, Boston.—p. 1063.
Effects of Vitamin C Intake on Degree of Tooth Injury Produced by Diphtheria Toxin. C. G. King, R. R. Musulin and W. F. Swanson, Pittsburgh.—p. 1068.
Utilization of Available Resources in Control of Tuberculosis. W. C. Williams, Nashville, Tenn.—p. 1073.
Longevity of Eberthella Typhosus in Various Soils. P. J. Beard, Stanford University, Calif.—p. 1077.
Wilson Method for Bacteriologic Examination of Water. R. Ferramola, Buenos Aires, Argentina.—p. 1083.
Health Education Through the Ages. O. Temkin, Baltimore.—p. 1091.
Programs for Public Health Nurses in Birth Control Work: Outline Developed in North Carolina State Board of Health for Staff Education. Frances R. Pratt, Raleigh, N. C.—p. 1096.

Archives of Neurology and Psychiatry, Chicago

44:701-928 (Oct.) 1940

- Experimental Studies on Headache: Further Analysis of Histamine Headache and Its Pain Pathways. G. A. Schumacher, B. S. Ray and H. G. Wolff, New York.—p. 701.
- Human Pyramidal Tract: II. Numerical Investigation of Betz Cells of Motor Area. A. M. Lassek, Charleston, S. C.—p. 718.
- Changes in Nervous System Following Carbon Disulfide Poisoning in Animals and in Man. B. J. Alpers and F. H. Lewy, Philadelphia.—p. 725.
- Surgical Division of Commissural Pathways in Corpus Callosum: Relation to Spread of Epileptic Attack. W. P. Van Wagenen, Rochester, N. Y., and R. Y. Herren, Portland, Ore.—p. 740.
- Faradic Shock in Treatment of Functional Mental Disorders: Treatment by Excitation Followed by Intravenous Use of Barbiturates. N. J. Berkwitz, Minneapolis.—p. 760.
- Connections of the Red Nucleus. J. W. Papez and W. A. Stotler, Ithaca, N. Y.—p. 776.
- "Spinal Dysraphism": Spina Bifida and Myelodysplasia. B. W. Lichtenstein, Chicago.—p. 792.
- Advantages and Danger of Combined Anoxic and Insulin Shock: Report of Animal Experiments with Possible Method of Treatment for Schizophrenia. J. Tannenber, Bedford Hills, N. Y.—p. 811.
- Behavior of Electrolytes in Familial Periodic Paralysis. J. W. Ferrebee, Mildred K. Gerity, Dana W. Atchley and R. F. Loeb, New York.—p. 830.
- Familial Paroxysmal Chorea-Athetosis: Preliminary Report on a Hitherto Undescribed Clinical Syndrome. L. A. Mount and S. Reback, New York.—p. 841.
- Chronic Encephalitis: Pathologic Report of Case with Protracted Somnolence. R. B. Richter and E. F. Traut, Chicago.—p. 848.
- Diabetes Insipidus. T. H. McGavack, J. W. Benjamin and S. Liebowitz, New York.—p. 867.
- Resorption of Intracranial Gumma Under Electro-Encephalographic Control. Margaret Rheinberger and J. Siris, New York.—p. 879.

Canadian Medical Association Journal, Montreal

43:201-304 (Sept.) 1940

- Shock: Its Cause and Treatment. J. C. Meakins, Montreal.—p. 201.
- Studies in Experimental Shock. C. H. Best and D. Y. Solandt, Toronto.—p. 206.
- Soldier's Documents: Their Value to the Soldier for Possible Pension. W. C. Arnold, Ottawa, Ont.—p. 210.
- *Routine Chest X-Ray Examination of Recruits: Survey of Results. W. A. Jones, Ottawa, Ont.—p. 213.
- Etiology and Modern Treatment of Varicose Ulcer. J. C. Luke, Montreal.—p. 217.
- Pneumocystogram. R. W. Boyd, Calgary, Alta.—p. 221.
- Bronchomoniliasis in Saskatchewan. D. M. Baltzan, Saskatoon, Sask.—p. 224.
- Pancreatic Lithiasis. S. R. Townsend, Montreal.—p. 228.
- Combined Surgical and Fluoroscopic Method of Inserting the Smith-Petersen Nail. G. H. Ryan and D. Wheeler, Winnipeg, Man.—p. 231.
- Oral Desensitization in Food Allergy. H. E. Edwards, Toronto.—p. 234.
- Therapy of Peptic Ulcer. W. Goldie, Toronto.—p. 236.
- Ophthalmoplegic Migraine: Report of Case. A. J. Elliot, New York.—p. 242.
- Management of Infections of Kidney and Bladder. A. M. Crance, Geneva, N. Y.—p. 244.
- Newer Drugs in Treatment of Epilepsy. J. N. Petersen and H. M. Keith, Montreal.—p. 248.
- High Spinal Anesthesia. R. J. Fraser, Hamilton, Ont.—p. 251.
- Pellagra: Report of Case. A. T. Gillespie, Fort William, Ont.—p. 255.
- Ragweed Situation in Eastern Canada in Relation to Hay Fever. H. Groh and W. H. Minshall, Ottawa, Ont.—p. 258.
- Spinal Appendicitis. C. B. Rich, Edmonton, Alta.—p. 260.
- Oil of Wintergreen Poisoning: Report of Two Additional Fatal Cases. W. T. Shirreff and L. N. Pearlman, Ottawa, Ont.—p. 264.

Routine Chest X-Ray Examination of Recruits.—Jones states that the survey begun Nov. 6, 1939, and ended at the end of April 1940 for the discovery of concealed thoracic disease among recruits otherwise considered fit for service disclosed that a little more than 1.5 per cent were not fit. Of several thousand examined about 1 per cent were rejected because of present or past pulmonary tuberculosis, and slightly more than 0.5 per cent because of other respiratory and circulatory diseases, while about 0.1 per cent were refused for miscellaneous conditions, such as substernal thyroid, tuberculosis of the spine and marked scoliosis, missed at the physical examination. There were seventeen cases of silicosis, one from a district not known to have this disease, but further investigation, prompted by this discovery, resulted in the finding of six more instances among the man's fellow workers. The survey has disclosed 240 cases of tuberculosis among enlisted troops and probably as many more among candidates for enlistment. The study likewise resulted in the rejection of 0.22 per cent with other types of respiratory disorders and of 0.294 per cent of all applicants because of the abnormal size or shape of the heart. The outline of a tuberculous abscess along the thoracic spine or the demonstration of a tumor or marked scoliosis accounted for 0.093 per

cent more rejections. The survey is worth while because it protects other service men from tuberculous infection and as a means of preventing the unfit from entering the service. It is sound economically because its cost is relatively low and because of the potential saving of enormous treatment and pension costs. Concurrently, the survey is an important civilian public health project. To make it more effective those medical officers on whom devolves the personal care of sailors, soldiers and airmen should always be on the alert for early symptoms of tuberculosis, and the fullest use of x-ray facilities should be made in all chest cases or possible chest cases.

Canadian Public Health Journal, Toronto

31:407-456 (Sept.) 1940

- Prevention of Streptococcal Infection of Wounds. R. Hare, Toronto.—p. 407.
- The Whence and Whither of Milk Sanitation. R. S. Breed, Geneva, N. Y.—p. 414.
- Rabies Infection. A. E. Cameron, Ottawa, Ont.—p. 424.
- Observations on Nutritive Value of Bread. E. W. McHenry, Toronto.—p. 428.
- Two Phage-Susceptible Types of *Bacillus Typhosus* Isolated from Typhoid Fever Case. Dorothy E. Helmer, Donna E. Kerr, C. E. Dolman and L. E. Ranta, Toronto.—p. 433.

Journal of Immunology, Baltimore

39:171-264 (Sept.) 1940

- Studies of Early Stage of Resistance to Pneumococcal Infection: I. Relation to Early Hypersensitive Response of the Tissues. Josephine McBroom and Helen Schlesinger, Pittsburgh.—p. 171.
- Id.: II. Type Specificity and Humoral Immune Body Production. Helen Schlesinger and Josephine McBroom, Pittsburgh.—p. 185.
- Detectability of Pneumococcal Capsular Polysaccharide and Antibody in Blood, Broth and Saline Solution (Optimal Concentration of Antigen and Antibody). S. C. Bukantz and P. F. de Gara, New York.—p. 195.
- Elimination of Horse Serum Specificity from Antitoxins. R. D. Coghill, N. Fell, Martha Creighton and G. Brown, Detroit.—p. 207.
- Physical-Chemical Study of Normal and Immune Horse Serums. N. Fell, K. G. Stern and R. D. Coghill.—p. 223.
- Complete Fixation in Human Malaria: I. Results Obtained with Various Antigens. Anna Dean Dulaney and W. K. Stratman-Thomas, Memphis, Tenn.—p. 247.
- Id.: II. Diagnostic Application. W. K. Stratman-Thomas and Anna Dean Dulaney, Memphis, Tenn.—p. 257.

Kansas Medical Society Journal, Topeka

41:365-408 (Sept.) 1940

- Role of Endocrines in Pediatric Practice. J. D. Boyd, Iowa City.—p. 365.
- Immediate Repair of Flexor Tendons. R. E. Speirs, Dodge City.—p. 370.
- Biologic and Biochemical Study of Curare: Preliminary Report. M. E. Pusitz, J. L. Lattimore, A. Gold and H. Ebendorf, Topeka.—p. 374.
- *Embolic Phenomenon Associated with Bacterial Endocarditis. R. C. Jeffries, Atchison.—p. 379.
- Lipoid Pneumonia: Report of Case. R. M. Carr, Junction City.—p. 381.

Embolic Phenomenon with Bacterial Endocarditis.—Jeffries believes that the difficulty in the diagnosis of subacute or chronic endocarditis is in most instances due to the absence of symptoms and the fact that a cardiac murmur in fever is not proof of endocarditis. The general septicemic and pyemic symptoms are often ascertained at a late date in the course of the disease. Thus, if the various types of endocarditis are to be recognized clinically all the important physical signs and symptoms of emboli must be considered. The recognition of embolic phenomena as sequels to endocardial disease is diligently sought for in those cases in which endocardial foci are known to be present or suspected. In such instances they lend confirmatory evidence. Generally the symptoms and physical signs of emboli vary rapidly and are mechanical or secondarily suppurative in effect. Emboli may be single or multiple. It is often difficult to be certain whether symptoms are of septicemic or embolic origin, particularly when splenic enlargement, hematuria or purpura occurs. Purulent invasion of the tissues about the joints is a frequent occurrence in the streptococcal type. Such an incident is quite distinct from petechiae, and infarction must also be distinguished. Although petechiae are often regarded as of embolic origin there is no proof of this. A perivascular reaction to an exotoxin in the capillary arterial bed is the most plausible explanation, probably representing an allergic phase. Perivascular lesions which occur about the joints and produce erythema and pain with occasional effusion into the joint cavity are of great clinical

importance. These little episodes, which usually clear up in three or four days, may be the one crucial symptom offered in evidence for the final determining diagnosis. Two cases of subacute bacterial endocarditis are presented which illustrate early embolic phenomena.

Maine Medical Association Journal, Portland

31:235-266 (Sept.) 1940

- Psychotherapy in General Medical Practice. M. R. Kaufman, Boston.—p. 235.
Clinical Analysis of Insulin Hypoglycemic Shock Therapy for Schizophrenia at the Bangor State Hospital from Dec. 1, 1937, to Jan. 1, 1940: Preliminary Report with Brief Review of Literature. E. Blank, Bangor.—p. 240.
Subdiaphragmatic Air as Sign of Perforated Peptic Ulcer. H. G. Hadley, Washington, D. C.—p. 246.

North Carolina Medical Journal, Winston-Salem

1:463-522 (Sept.) 1940

- Birth Control in the North Carolina Health Department. G. M. Cooper, Raleigh.—p. 463.
Prevention, the Health Department and the Practicing Physician. W. P. Richardson and D. Klais, Chapel Hill.—p. 468.
Appendicitis: The Two P's and the Highest Mortality in the World. D. B. Cobb, Goldsboro.—p. 472.
Headache. B. W. Fassett, Durham.—p. 478.
Fibrous Cavernositis (Peyronie's Disease). R. W. McKay, Charlotte.—p. 484.
Diphtheria in North Carolina. E. Lupton, Raleigh.—p. 487.

Oklahoma State Medical Assn. Jour., Oklahoma City

33:1-58 (Sept.) 1940

- Sanatorium Care. F. P. Baker, Tahleah.—p. 1.
Leprosy in Oklahoma: Case Report. O. G. Hazel and W. M. Hull, Oklahoma City.—p. 3.
Advantages and Disadvantages of Prostatic Resection. B. A. Hayes, Oklahoma City.—p. 7.
Artificial Pneumothorax in Nontuberculous Disease of Lung. P. B. Cameron, Tulsa.—p. 10.
The General Practitioner's Practice with Macrocytic Anemia. J. R. Taylor, Kingfisher.—p. 13.

Pennsylvania Medical Journal, Harrisburg

43:1665-1896 (Sept.) 1940

- Appraisal of Children After Birth Injury. B. Crothers, Boston.—p. 1677.
Some Everyday Problems in Otolaryngology. J. B. McMurray, Washington.—p. 1690.
Placenta Praevia: Factors Leading to Death in Thirty-Nine Cases. R. A. Kimbrough Jr. and P. Tompkins, Philadelphia.—p. 1694.
Treatment of Anemias Other Than Addisonian Pernicious Anemia. A. J. Creskoff, Philadelphia.—p. 1697.
Diabetes: V. Use of Protamine Zinc Insulin in Children. G. Booth, Pittsburgh.—p. 1701.
Radiologic Gastrointestinal Studies in Eczema. A. Strickler and N. O'Farrell, Philadelphia.—p. 1703.
Perforated Peptic Ulcer. F. M. Pugliese, Wilkes-Barre.—p. 1709.
*Use of Testosterone Propionate in Treatment of Premenopausal Dysfunctional Uterine Bleeding. C. Mazer and M. Mazer, Philadelphia.—p. 1713.

Testosterone Propionate for Uterine Bleeding.—The Mazers list the advantages of testosterone therapy for the treatment of premenopausal dysfunctional uterine bleeding as follows: 1. It obviates the need of applying radium or the use of x-rays, which is usually followed by severe climacteric symptoms. 2. It does not cause sudden and permanent amenorrhea. 3. It does not require hospitalization and is therefore readily accepted by most patients. The Mazers find that smaller doses, a total of from 50 to 200 mg. given over a month, are effective and do not evoke masculinizing changes. Testosterone propionate relieves dysfunctional uterine bleeding in about 50 per cent of the patients who submit to a month's treatment. The modus operandi of the smaller doses in controlling uterine bleeding of the dysfunctional type is either through the ability of the product to neutralize the continuous action of estrogen on the müllerian tract or through inhibition of the unknown endometrial bleeding factor. Regardless of dosage, it cannot rejuvenate aging ovaries or stimulate the ovaries of younger women to biphasic activity; therefore its influence on dysfunctional uterine bleeding is temporary but long enough to permit natural readjustment to take place. Failure of readjustment results in recurrences. The authors treated sixty-four women, forty-eight of premenopausal age and sixteen younger women, with testosterone propionate in sesame oil given intramuscularly every other day for one month.

Forty-four women received a total of from 50 to 200 mg. and twenty from 300 to 600 mg. Thirty-five preliminary curettages were performed as an office procedure to eliminate malignant growths. The remaining women refused to submit to a curettage. A cure was considered to have been effected if the abnormal uterine bleeding ceased during the month of treatment and did not recur for at least three months after its withdrawal. The follow-up period ranged from three to nineteen months with an average of 7.6 months. Forty-two of the sixty-four patients (66 per cent) were cured and twenty-two (34 per cent) were not or were only temporarily improved. Twenty-seven, or 77 per cent, of the thirty-five women who were curetted remained well during the follow-up period, whereas only fifteen of the twenty-nine noncuretted patients remained well for this length of time. This indicates that in 25 per cent curettage alone arrested the dysfunctional uterine bleeding for a period of three or more months, at least long enough for the endocrine imbalance to adjust itself. This is in accord with the authors' experience with eighty-two metrorrhagic women who had received no other treatment than curettage. Larger doses of testosterone did not yield better results; fourteen noncuretted patients received the larger doses with a cure in seven, and fifteen noncuretted patients received the smaller doses with a cure in eight. Seven of the forty-two cured patients had recurrences of uterine bleeding in less than six months after withdrawal of treatment. There were no constitutional ill effects among the sixty-four treated patients. Four patients conceived within one to ten months after withdrawal of treatment. Three of them were delivered of normal infants and one had an induced abortion. The climacteric symptoms complained of by some patients were not influenced even by the larger doses employed.

Quarterly J. of Studies on Alcohol, New Haven, Conn.

1:201-412 (Sept.) 1940

- Metabolism of Alcohol: Review. T. M. Carpenter, Washington, D. C.—p. 201.
Food Value of Ethyl Alcohol. H. H. Mitchell and Elizabeth G. Curzon, Urbana, Ill.—p. 227.
Hospitalized Patients with Alcohol Poisoning. Marta Fraenkel, New York.—p. 246.
Delirium Tremens. H. Wortis, New York.—p. 251.
Availability of Ethyl Alcohol for Human Brain Oxidations. W. Goldfarb and J. Wortis, New York.—p. 268.
Analysis of Psychologic Experiments on Effects of Alcohol. E. M. Jellinek and R. A. McFarland, Boston.—p. 272.

Radiology, Syracuse, N. Y.

35:261-390 (Sept.) 1940

- *Lipoid Pneumonitis. B. R. Kirklin, Rochester, Minn.—p. 261.
Diagnosis and Treatment of Cancer of Tonsil. W. L. Mattick, Buffalo.—p. 268.
Bilateral Hypernephroma. J. F. Elward and R. L. Spire, Washington, D. C.—p. 274.
Physical Doses and Biologic Doses. M. Ponzio, Turin, Italy; translation by E. T. Leddy, Rochester, Minn.—p. 282.
Cardiovascular Dynamics: Roentgen Kymographic Study. S. Brown, J. E. McCarthy and A. Fine, Cincinnati.—p. 290.
Report of Few Recent Experiments on Biologic Effects of Magnetic Fields. M. Lenzi, Modena, Italy; translated and revised for publication under supervision of G. Failla, New York.—p. 307.
*Roentgenologic Aspects of Metastases. M. J. Hubeny and M. Mass, Chicago.—p. 315.
Use of Fast Neutrons in Treatment of Malignant Disease: Preliminary Report on Use of Fast Neutrons in Treatment of Malignant Disease. R. S. Stone, J. H. Lawrence and P. C. Aebersold, San Francisco.—p. 322.
Multiple Cystic Tuberculosis of Bones: Its Roentgen Picture and Reparative Process as Seen in Serial Roentgenograms. J. L. Law, Ann Arbor, Mich.—p. 328.
Clinical Application of Urinary Dynamics. E. L. Shiflett and D. Y. Keith, Louisville, Ky.—p. 336.
Roentgen Visualization of Some Commoner Lesions of Lower Genito-Urinary Tract. L. E. Sorrell, Birmingham, Ala.—p. 341.
Postrenal Anuria Following Roentgen Therapy for Pelvic Tumors. G. W. Chamberlin, F. L. Payne and L. W. Stevens, Philadelphia.—p. 346.
Blocking of Ureters in Intravenous Pyelography by Means of Filling Bladder with Oil. J. Arendt and L. A. Maslow, Chicago.—p. 350.

Lipoid Pneumonitis.—Kirklin points out that since 1920 it has been known that certain oils when introduced into the lungs are capable of causing severe reactive changes in the pulmonary tissues. Such reactions were produced experimentally by Guieysse-Pellissier with intratracheal injections of olive oil, and later by Corper and Freed. The clinical significance of these experiments was not fully appreciated at first and no one sus-

pected that lipoids in food or commonly administered intranasal and gastrointestinal medicaments might be aspirated into the pulmonary parenchyma and there produce grave organic changes. Not less than seventy-two proved cases of lipoid pneumonitis or pneumonia have been reported within the last six years. Available evidence indicates that lipoid pneumonitis is not merely a pathologic curiosity but a rather common condition. To the roentgenologist the disease is of the utmost interest, for he has the most favorable opportunity to establish or suggest the diagnosis and he can recall many instances from the past in which the disorder was not recognized because its existence was not known. The x-ray manifestations vary according to the stage of the disease and the presence or absence of complicating bronchopneumonia. In early, mild, uncomplicated cases, fleck-like shadows appear in the basal and central portions of both lower lobes, often predominating on the right and sometimes involving the right middle lobe. The flecks extend to the periphery of the lung, and the entire appearance, described by Davis as "miliary mottling," is attributable to the alveoli with their thickened walls and phagocytosed lipid contents. When the disease progresses the bronchovascular-lymphatic markings become more accentuated and modulated, and in severe cases gross, irregularly shaped, rather dense, discrete and confluent shadows of consolidations are interspersed through the region. In chronic and severe cases there is evidence of fibrosis, with strandlike shadows along the bronchovascular trunks together with dense, sharply defined, irregular or rounded shadows. These vary in size, number and distribution but are often largest or most numerous in the hilar regions. Signs of local atelectasis, compensatory emphysema or effusion may be present. As a result of fibrous contraction, an entire lobe may be represented by the dense rounded shadow of a tumor-like mass. When bronchopneumonia supervenes the x-ray signs become more extensive and complex in ratio to the amount, intensity and site of bronchopneumonic involvement. The x-ray diagnosis must differentiate between tuberculosis, miliary tuberculosis, miliary metastasis, bronchiolitis obliterans, bronchiectasis, primary carcinoma of the lung, malignant metastasis and pneumoconiosis. In considering the last mentioned the roentgenologist will not be entirely wrong, although he will be thinking of silicosis or anthracosis instead of lipoidosis. The diagnosis of lipoid pneumonia, like that of many other diseases, requires chiefly that the disorder be considered among the alternatives.

Roentgenologic Aspects of Metastases.—Hubeny and Mass maintain that the estimated incidence of skeletal and pulmonary metastases fell far short from the actual incidence in their 1,365 cases of malignant disease. Approximately 74 per cent of their cases of skeletal or pulmonary metastases showed this roentgenographically. This is a considerable increase over previous estimates. Analysis of cases of carcinoma of the breast and prostate show that there are no dependable criteria for rationalizing metastatic phenomena. Among the 1,365 cases, 167 showed skeletal metastases—an incidence of 12 per cent. In eighty-three cases of carcinoma of the esophagus, seven instances of bone metastases were encountered. In twenty-three cases of lymphosarcoma, seven showed skeletal involvement, an incidence of 30 per cent. Carcinoma of the liver (cholangiocellular and hepatocellular) presented an incidence of 11.5 per cent (three of twenty-six cases). In sixty-nine cases of carcinoma of the pancreas, three were found to have bone deposits. In sixteen cases of osteogenic sarcoma examined at necropsy, two cases of distant skeletal metastases were recorded. Four of sixteen cases of carcinoma of the testes showed metastases to bone. In epidermoid carcinomas from the oral cavity, nasopharynx and skin seven instances of skeletal metastases were found among twenty-five cases. In twenty-three cases of carcinoma of the urinary bladder, four instances of skeletal metastases were encountered. Among 150 cases of bronchogenic carcinoma there were thirty-six cases with skeletal metastases. Skeletal metastasis was equally high, in comparison to the heretofore reported incidence, among cases of carcinoma of other organs. A higher incidence of skeletal metastasis is undoubtedly found in necropsy material, but these metastatic foci are present long before the case comes to necropsy and can be found when a diligent search is made. Whether unrecognized skeletal metas-

tases may in some measure explain deaths from relatively insignificant primary growths is not clear, but certainly a profound effect is exerted on the function of the bone marrow. There were 359 instances of pulmonary metastases in the entire series, an incidence of 27.6 per cent. There were ninety-seven cases of carcinoma of the prostate; twenty-three of these were found incidentally at postmortem and in three skeletal metastases with no other metastatic involvement was present not even in the regional lymph nodes. Of the remaining seventy-four cases, thirty-three presented postmortem evidence of metastases to the skeleton, lung, pleura or intrathoracic lymph nodes. Roentgenograms were taken in twenty-four of these thirty-three cases and in sixteen diagnostic x-ray signs of pulmonary or skeletal metastases were present. There were intrathoracic metastases in twenty-four (70 per cent) as compared with 50 per cent observed roentgenographically. In thirteen of these there were no skeletal metastases and nine of them involved the lung parenchyma. This is contrary to the opinions expressed by Bumpus and others that pulmonary metastases probably never occur without associated skeletal involvement. The first clue of a cancer of the prostate in one of the cases studied came from a supraclavicular node. A similar condition existed among the mammary carcinomas; of seventy-seven cases of carcinoma of the breast, sixty-three cases presented evidence of skeletal or intrathoracic involvement (81 per cent). The authors conclude that it is unwarranted to suppose that skeletal metastases are late manifestations. The roentgenologist found a higher incidence of skeletal metastases than the pathologist. Pain may precede an observable skeletal lesion by from three to eighteen months. Skeletal manifestation after surgery may in many instances be evidence of omission on the part of the surgeon and roentgenologist, as many months are usually required for a skeletal lesion to assume obvious proportions. Therefore painstaking observations should be made. The authors think that the patient's life expectancy may actually be diminished by radical surgical procedures when existing skeletal metastases are existent but not obvious, at which time radical surgical procedures are not advisable.

Rhode Island Medical Journal, Providence

23:145-162 (Sept.) 1940

- Circle of Willis: Its Angles and Its Aneurysms. C. A. McDonald and M. Korb, Providence.—p. 145.
Reduction of Fractures of Acetabulum with Penetration of Head of Femur into Pelvis: Report of Three Cases. R. L. Maynard, Burlington, Vt.—p. 150.

Southern Surgeon, Atlanta, Ga.

9:697-774 (Oct.) 1940

- Breast Tumors. T. C. Davison and E. F. Rudder, Atlanta, Ga.—p. 697.
Surgery in Diseases of Lungs and Pleura. A. Lambert, New York.—p. 710.
Spinal Meningiomas: Report of Four Cases, Three of Which Were in Negroes. F. K. Bradford, Houston, Texas.—p. 722.
Experimental Study of Embolic Effects of Air and of Carbon Dioxide. R. M. Moore and C. W. Braselton Jr., Galveston, Texas.—p. 733.
Surgical Treatment of Pulmonary Tuberculosis with End Results. H. A. Acuff, Knoxville, Tenn.—p. 738.
Intravertebral and Intrathoracic Blastomycoma Simulating Dumbbell Tumor. W. M. Craig, M. B. Dockerty and S. W. Harrington, Rochester, Minn.—p. 759.

Southwestern Medicine, El Paso, Texas

24:287-318 (Sept.) 1940

- Masquerades of Bronchiogenic Carcinoma. W. S. Middleton, Madison, Wis.—p. 287.
Spirochetal Bronchitis. G. H. Hess, Bisbee, Ariz.—p. 296.
Infant Feeding. R. L. Jackson, Iowa City.—p. 298.
Incidence of Agglutinins for Proteus OX19. R. A. Green, E. L. Breazeale and H. B. Harding, Tucson, Ariz.—p. 300.
Some Actions of Alcohol. W. R. Counts, Amonate, Va.—p. 301.

Tennessee State Medical Assn. Journal, Nashville

33:333-374 (Sept.) 1940

- Illustrative Lesions About the Sella Turcica and Optic Chiasm. N. Gotten, Memphis.—p. 333.
Contraception: Medical Problems of Growing Importance. H. H. Jenkins, Knoxville.—p. 342.
Contact Infections in Children. W. E. Van Order, Chattanooga.—p. 350.
Analysis of Metrazol Therapy, Together with Theory of Interpretation. J. F. Blalock Jr., O. S. Hauk and P. L. Boynton, Nashville.—p. 353.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2:307-344 (Sept. 7) 1940

- Nonpenetrating Injuries of Heart. R. G. Anderson.—p. 307.
- Insulin Treatment of Schizophrenia in Wartime. J. S. McGregor and R. A. Sandison.—p. 310.
- Spontaneous Pneumothorax Simulating Coronary Disease. G. Bourne.—p. 313.
- Gold Therapy in Rheumatoid Arthritis. P. Ellman, J. S. Lawrence and G. P. Thorold.—p. 314.
- Wartime Precautions for the Diabetic. R. D. Lawrence.—p. 316.
- Phrenicocostal Sinus Pneumonia. G. R. Osborn.—p. 317.

2:345-372 (Sept. 14) 1940

- Local Anesthesia in General Surgery. H. Dodd.—p. 345.
- Cerebral Thrombophlebitis. C. P. Symonds.—p. 348.
- Possibilities of Nerve Grafting. F. H. Bentley and Margaret Hill.—p. 352.
- Fulminating Septicemia Associated with Purpura and Adrenal Hemorrhage (Waterhouse-Friderichsen Syndrome). J. F. Hughes.—p. 353.
- *Eleven Years of Diphtheria Immunization in a Rural District. G. Nicholson and Audrey Z. Baker.—p. 354.

Diphtheria Immunization in a Rural District.—Nicholson and Baker report the results of eleven years of diphtheria immunization in the rural district and borough of Tiverton. They traced the annual incidence of diphtheria for the section since 1912 and find that there were sharp and definite peaks in 1913, 1921 and 1929. The cyclic peak years appear to be regular and from the data the next peak was to be expected in 1937. Neither in that year nor in the two subsequent years did any increase occur. Inoculations were begun during the 1929 epidemic and have been continued ever since, a few schools being treated each year. By the end of 1939 approximately 4,000 children less than 15 years of age had been inoculated; that is, some 45 per cent of the child population has been protected. The Ministry of Health (1940) considers that, if 75 per cent of all children less than 15 years of age were immune, the disease would be abolished. The authors believe that the absence of a peak in 1937 was due to the protective measures taken and has not been merely a fortuitous occurrence. Three instances occurred in the district in which the only uninoculated child in a household contracted diphtheria, whereas the remaining children escaped. Four children in one village contracted severe faucial diphtheria about one month after inoculation, but no case of clinical diphtheria occurred in the district in any child who had been inoculated three or more months previously. Several outbreaks were terminated in various villages by means of inoculation. Since inoculation, an occasional sporadic case of diphtheria has occurred in a village, sometimes in a visitor, with no cases following, whereas prior to inoculation cases usually occurred in groups. With regard to compulsory immunization the authors feel that it has yet to be shown that this is really necessary. Lectures to parents should prove more efficacious than the mere issuance of pamphlets, which are not always read. Since 1934 it has been their practice to carry out a follow-up campaign in the borough at intervals of two years, when it is necessary to deal only with the junior schools. Usually about 150 children are inoculated on each occasion.

Lancet, London

2:287-316 (Sept. 7) 1940

- Plaster of Paris. G. R. Girdlestone.—p. 287.
- Types of Tubercle Bacilli in Pulmonary Tuberculosis in Northeast Scotland. A. S. Griffith and J. Smith.—p. 291.
- Test for Effective Sterilization of Dressings. R. J. Willan.—p. 294.
- *Preparation and Use of Human Serum for Blood Transfusion in Shock. J. W. Clegg and J. H. Dible.—p. 294.
- *Effects of Arterial Ligation on Vasomotor System. R. Leriche and M. G. Werquin.—p. 296.
- Relapsing Cerebrospinal Fever: Failure of Chemotherapy. D. T. Thomas.—p. 297.

Preparation of Serum for Transfusion in Shock.—Clegg and Dible point out that the use of stored blood is limited by its rapid deterioration and that it had been advocated to separate the plasma from stored blood and use it as an alternative to whole blood. However, the resulting plasma-saline-citrate mixture has disadvantages. Among others, the fibrinogen fraction is unstable and precipitates and thus the plasma solution comes to contain particulate matter. The authors tried to produce a

plasma or serum suitable for the treatment of shock. The usual methods of filtering the plasma-saline mixture proved unsatisfactory for large-scale work: either the filter becomes blocked with fibrin or the filtrate, which is at first clear, develops a precipitate on standing. Even when only a small quantity is filtered, the fibrinogen may precipitate after a few hours or days. Since it seemed difficult to keep the fibrinogen in solution and since this forms only a small fraction of the total protein, the authors decided to eliminate it and convert the plasma into serum by precipitating the fibrinogen with calcium. In this way they have prepared a serum which appears to have all the clinical advantages of plasma. In addition it passes quickly and easily through a bacterial filter, is sterile and contains no particulate matter, and no filter is used when administering it. Plasma from group A and group O donors has been used and the resulting serum administered to recipients of a different group without reactions. The authors give a detailed description of the technic of preparing serum from stored blood. The advantages of this process are that the serum is sterile, is of a satisfactorily high protein content and can be given to patients irrespective of their blood groups. The solution seems to remain free of particulate matter. The process utilizes blood which has been in the bank too long to be used for whole-blood transfusion, thus effecting a big economy.

Effects of Arterial Ligation on Vasomotor System.—According to Leriche and Werquin, arterial wounds are usually treated by direct ligation, but insufficient attention has hitherto been given to the vasomotor effects in the limb supplied by the artery. The authors became convinced of the importance of these effects. When an artery has been ligated, the resultant thrombosis makes the distal part of the limb cold, cyanotic and weak. A ligature acts as a severe trauma and produces reflex vasoconstriction distally; this reflex can be removed by resection of the obliterated length of the affected artery. The wound, dry before, starts to ooze blood as soon as the thrombosed artery is removed; nor is the effect passive or paralytic, for the blood is circulating more quickly and the local temperature is increased. This is not purely of physiologic interest; it is a practical aspect of arterial ligation, gangrene and ischemia. The vasoconstriction reflex can be abolished by arterial section between ligatures, by periarterial sympathectomy above the lesion, by anesthetic infiltration of the adventitious coat, by regional infiltration of the sympathetic system or by section and ganglionectomy. Ischemic gangrene should no longer be inevitable, and the risk attendant on arterial ligation should be much lessened. Of primary importance in the reestablishment of circulation are the existence and the patency of intact collaterals. The main artery must be free from extensive thrombosis; ligation must therefore be performed under aseptic conditions to limit the chances of thrombosis. Extensive trauma and extensive excision of muscle both cause destruction of collaterals, and a large hematoma may compress them; in either case gangrene may result. This is why ligation in war wounds is particularly liable to be followed by gangrene. Failure in the reestablishment of circulation in a limb may also be contributed to by lowering of the general blood pressure by hemorrhage or shock. A blood loss of from 1,000 to 2,000 cc. is common in war wounds and causes such hypotension that ischemia below the ligature is just about fatal. Blood transfusion of from 400 to 500 cc. or the slow intravenous infusion of 1,000 cc. or more of warm serum will counteract anemia but may not restore the constricted peripheral circulation. Double splanchnic anesthesia might be tried. The disturbances following ligation may be grouped under three headings: 1. A mechanical syndrome grading from massive gangrene down to localized necrosis in muscles causing orthopedic troubles later. 2. Functional disorders, such as intermittent claudication. 3. Vasomotor disorders, such as cyanosis, trophic troubles and muscular paresis. The best prophylaxis would be the substitution of suture for ligation; this, however, is generally impossible in war wounds. The next best thing is limited resection of the artery between two ligatures, the blood pressure at the same time being maintained to help the rapid flow of the blood back into the limb. Periarterial sympathectomy above the ligature is also useful, as is infiltration or section of the regional sympathetic plexus. It is important to remember the time limit; if infiltration is to be done, it must be done at once. Delay is

fatal, because the tissues die quickly. Infiltration of the cervical or the lumbar sympathetic is more necessary than warming the patient with cotton-wool or with radiant heat. It is not the skin that wants the warmth so much as the deep tissues.

Medical Journal of Australia, Sydney

2:187-208 (Aug. 31) 1940

Plea for Reorganization of the Medical Profession. A. E. Brown.—p. 187.

Behavior of Blood Platelets in Thyrotoxicosis. P. Woodruff.—p. 190.

Revista de Chirurgie, Bucharest

43:305-464 (May-June) 1940. Partial Index

*Myelography in Diagnosis of Spinal Fractures. Amza Jianu and T. Firica.—p. 305.

Fibrocystic Osteitis of Rib: Case. A. Cosacesco.—p. 313.

Myelography in Diagnosis of Spinal Fractures.—Amza Jianu and Firica discuss the technic of x-ray examination of the spine after intraspinal injection of iodized oil and the diagnostic value of the procedure in fractures of the spine with nervous symptoms from compression of the cord or the nerve roots. Fractures of this type are frequently associated with posterior herniation of the nucleus pulposus of the intervertebral disks, thickening and calcification of the lateral ligaments and minute displacements of bony fragments which produce compression of nervous tissue but fail to show on an ordinary x-ray examination. Myelography is indicated after failure of early orthopedic treatment. Early myelography is both useless and dangerous. Iodized oil is injected in amounts of 4 or 5 cc. at the level of the lesion suspected or suggested by slight deformity of the vertebra in a plain roentgenogram. Smaller amounts of oil may fail to show partial block of the oil at the seat of the compressing lesion. The roentgenograms are taken after intrathecal injection of iodized oil in the dorsoventral and ventrodorsal positions respectively, and right and left lateral films in the prone and upright positions. They are taken at a distance of 150 or 200 cm. between the plate and the anticathode. Anteroposterior and right and left lateral myelograms taken in the dorsoventral position are of great diagnostic value. They show clearly the partial blocking, even if moderate, at the seat of the lesion. A myelographic diagnosis of the abnormality is an indication for surgical intervention. In the case reported by the author myelography demonstrated a fracture of the fifth lumbar vertebra with compression of the spinal cord by posterior herniation of the nucleus pulposus of the intervertebral disk.

Riforma Medica, Naples

56:705-736 (June 1) 1940

*Behavior of Gastric Secretion in Cholecystitis. A. Gugliucci.—p. 714.
Bronchiogenic Carcinoma: Case. S. Saitta.—p. 719.

Gastric Secretion in Cholecystitis.—Gugliucci employed histamine to determine the hydrochloric acid levels of twenty patients, five with and fifteen without calculus, who had been affected with gallbladder inflammation for a period of from two weeks to eight years, using roentgenoscopy as confirmatory evidence. He found hypochlorhydria in 45 per cent, hyperchlorhydria in 15 per cent, a tendency from hypochlorhydric acid deficiency to normal content in 10 per cent and normal levels in 30 per cent. The high percentage of hypochlorhydria and achlorhydria reported in cases in which Ewald's test was used in cholecyctic disorders is due, according to the author, to the inferiority of this test to the histamine test. The author believes that histamine is more effective in testing hydrochloric acid content, especially in latent cases of gastric miopragia and in differentiating true from false achlorhydria. In comparative assays histamine repeatedly disclosed hyperchlorhydria when Ewald's test indicated hypochlorhydria or achlorhydria. No regular connection was discovered between the behavior of hydrochloric acid secretions and the presence or absence of calculus. Hence the opinion that hyperchlorhydria is concomitant with cholecystitis involving calculus is not tenable. Greater significance is to be attached to the patient's condition, including his neurovegetative, endocrine and electrolytic behavior, than to the duration of the disorder or to the presence of a calculus. Chemical modifications of hydrochloric acid in cholecystitis tend toward gastric hypochlorhydria. However, no regularity of procedure is ascertainable.

Revista Med.-Quir. de Pat. Femenina, Buenos Aires

16:1-153 (July) 1940

*Theoretical and Experimental Foundations for the Preparation of New Lipoid Antigens in Serodiagnosis of Hydatidosis. M. A. Etcheverry.—p. 1.

New Lipoid Antigens as Serodiagnostic Aids in Hydatidosis.—Etcheverry investigated the complement fixation value of total and fractional lipid antigens extracted from powdered *Taenia echinococcus* and *Taenia saginata* by means of acetone, ether and alcohol. Lipoid antigens extracted from *Taenia saginata* were found diagnostically superior to those derived from *Taenia echinococcus*. Alcoholic extracts prepared with the ether insoluble fraction of powdered *Taenia saginata* were more potent diagnostically than total extracts, displayed no hemolytic power of their own, hindered complement fixation to a less degree and possessed a greater specificity. The addition of cholesterol increased sensitization without impairing specificity. Greatest antigenic power was discovered to inhere in lipoids insoluble in acetone and ether but soluble in alcohol. In fifty-three cases of ascertained hydatidosis, the author using the primarily ether insoluble and alcohol soluble lipid fraction of *Taenia saginata* without cholesterol obtained forty-six positive reactions out of fifty-three cases (86.79 per cent). On the other hand, the same fractionated lipid with the addition of cholesterol furnished fifty-one positive diagnostic reactions (96.22 per cent) in fifty-three cases of established infection. Applying the same cholesterol-strengthened fractional lipid to seventy-six controls, the author succeeded in securing seventy-three true negative results (96.05 per cent) and only three false positives. The superiority of purifying the antigen by separating from it the ether-soluble fraction can be discerned from the fact that total alcoholic extracts of *Taenia saginata* injected in sixty-seven proved cases of hydatidosis gave only fifty-three (79.1 per cent) positive reactions. The greater specificity obtainable by employing the fractional lipid antigens, primarily ether insoluble, was observed in 96.5 per cent of true negative reactions in seventy-six controls compared with a 78.44 per cent true negative diagnostic attainment in fifty-one controls tested by total alcoholic extract. Though unable to define the exact chemical structure of the specific active substance, the author succeeded in localizing it within a definite group of lipid substances. Extensive laboratory and biographic data accompany the monographic study.

Kinderärztliche Praxis, Leipzig

11:113-142 (April) 1940

*Antirachitic Curative Power of Irradiated Milk. K. Scheer.—p. 113.
Symptomatic Treatment of Serum Collapse. P. von Kiss and I. Flesch.—p. 121.

Sinus Thrombosis as Sequel of Injection? F. Hansen.—p. 119.
Unusual Symptomatology of Sinus Thrombosis. I. Zimányi.—p. 126.
Prophylaxis of Rickets. B. Dominick.—p. 131.
Dental Problems in Pediatrics. G. Matthes.—p. 134.

Antirachitic Action of Irradiated Milk.—Scheer states that the antirachitic effects of irradiated milk have been partly forgotten and that confused ideas exist regarding irradiated milk. Many are of the opinion that irradiated milk has a prophylactic but no therapeutic action. The author demonstrates the great antirachitic power of irradiated milk on the basis of new investigations. He reviews twelve cases of rickets occurring in different seasons of the year. Roentgenograms of five cases show that even severe forms of rickets are cured within a few weeks. The cure is not as rapid as when large doses of irradiated ergosterol are given. Feeding with irradiated milk has the therapeutic effect of the daily administration of about 6,000 international units. The children received the quantity of milk that corresponded to their age and their state of nutrition. They were given no other antirachitic treatment. That irradiated milk exerts no harmful effect has been proved by observations on 500 children. This milk is unchanged in odor and taste. Although the therapeutic action of irradiated milk has been demonstrated, its chief value is in the prophylaxis of rickets, because it can be provided for every child and the expense involved is small.

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THE SPONTANEOUS HYPOGLYCEMIAS

IMPORTANCE OF ETIOLOGY IN DETERMINING TREATMENT

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In the past few years the general medical profession has gradually become aware of the existence of a clinical syndrome characterized by the periodic occurrence of spontaneous hypoglycemia with its resulting symptoms relieved dramatically by the administration of sugar. The association of hypoglycemia with an overdose of insulin and the concept of endogenous hyperinsulinism, proposed by Harris¹ in 1924 and established by Wilder and his co-workers² in 1927 have led to the widespread misconception that hyperinsulinism is synonymous with spontaneous hypoglycemia. To be sure, hyperinsulinism is one of the most important causes of periodic spontaneous hypoglycemia in man. But, as will be indicated, there are many other abnormalities which produce an abnormally low level of the blood sugar and which, consequently, produce the same train of symptoms. Thus, in any case in which it is suspected that symptoms are due to hypoglycemia, the presence of abnormally low levels of blood sugar must be demonstrated during attacks and the symptoms in question relieved promptly by the administration of sugar. This establishes only the nonspecific diagnosis of spontaneous hypoglycemia. The etiologic diagnosis must now be sought by every diagnostic method at our disposal, for on the etiologic diagnosis rests the indicated therapeutic procedure. It is evident, for example, that an exploratory operation, designed to discover a pancreatic insuloma, will be a useless and dangerous procedure when the hypoglycemia results from hypofunction of the pituitary or adrenal glands or when it is due to a disturbed glycogenic mechanism of the liver.

It is beyond the scope of this presentation to discuss individually each of the possible causes of spontaneous hypoglycemia. It is evident that many of these etiologic factors will appear infrequently in patients with proved spontaneous hypoglycemia. It can be calculated from Wilder's²³ figures of etiologic incidence that, of fifty-five patients with manifestations of hypoglycemia in whom fasting blood sugar levels of 60 mg. per hundred cubic centimeters or below were obtained, forty-one

cases (75 per cent) were classified as falling into one of three groups, namely hyperinsulinism (organic type), neurosis (functional hyperinsulinism in our classification) and hepatic disease. Similarly, in an analysis of 278 cases of so-called spontaneous hypoglycemia reported by Martin and Hellmuth²⁴ only thirteen cases are found in which there were definite symptoms of hypoglycemia and in which fasting blood sugar levels below 60 mg. per hundred cubic centimeters were obtained. Ten of the thirteen cases (76 per cent) were listed as being due to organic hyperinsulinism, func-

ETIOLOGIC CLASSIFICATION OF SPONTANEOUS HYPOGLYCEMIA

I. Organic—recognizable anatomic lesion.

(a) Hyperinsulinism.

1. Pancreatic island cell carcinoma.³
2. Pancreatic island cell adenoma.⁴
3. Generalized hypertrophy and hyperplasia of islands of Langerhans.⁵

(b) Hepatic disease.

1. Ascending infectious cholangiolitis.⁶
2. Toxic hepatitis.⁷
3. Diffuse carcinomatosis.⁸
4. Fatty degeneration.⁹ "Fatty metamorphosis."¹⁰
5. Glycogenosis (von Gierke's disease).¹¹

(c) Pituitary hypofunction (anterior lobe).

1. Destructive lesions (chromophobe tumors, cysts and so on).¹²
2. Atrophy and degeneration (Simmonds' disease).¹³
3. Thyroid hypofunction (?secondary to pituitary hypofunction).¹⁴

(d) Adrenal hypofunction (cortex).

1. Idiopathic cortical atrophy.¹⁵
2. Destructive infectious granulomas.¹⁶
3. Destructive neoplasms.¹⁷

(e) Central nervous system lesions (lesions of brain and brain stem; said to interfere with nervous control of blood sugar).¹⁸

II. Functional—no recognized anatomic lesion.

(a) Hyperinsulinism¹⁹ (?autonomic nervous system imbalance).

(b) Renal glycosuria (severe degrees of low renal threshold for dextrose).²⁰

(c) Severe continuous muscular work.²¹

(d) Pregnancy and lactation.²²

tional hyperinsulinism and liver disease. If one includes all the cases of functional hyperinsulinism regardless of the fasting blood sugar level²⁵ the figure becomes 88 per cent in Wilder's series and 83 per cent in that of Martin and Hellmuth.

25. Patients with functional hyperinsulinism, as a general rule, maintain normal fasting blood sugar values but respond excessively to insulogenic stimuli, which results in rapid and frequently profound depressions of the blood sugar level. It is the only type in which a clinical diagnosis of periodic spontaneous hypoglycemia is justified in the continued absence of abnormally low levels of the fasting blood sugar.

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Owing to lack of space, this article has been abbreviated here by the omission of bibliographic references and other matter. The complete article appears in the author's reprints.

It appears, then, that from 80 to 90 per cent of all cases of spontaneous hypoglycemia fall into three groups, namely functional hyperinsulinism, organic hyperinsulinism and hepatic disease. With these points in mind, observations and procedures useful in differentiating the three important etiologic agents will be discussed. For purposes of clarity in differential diagnosis three illustrative cases are presented in the following order: (1) hepatogenic hypoglycemia, (2) organic hyperinsulinism and (3) functional hyperinsulinism:

CASE 1.—Hepatogenic hypoglycemia. This is one of six cases previously reported by us.⁶ It represents a type of severe chronic hepatogenic hypoglycemia which can be improved to the point of clinical cure by surgical removal of the source of a hepatitis.

W. F., a white man aged 47, a laborer, had been in good health until March 1934, when he began to have periodic attacks of unconsciousness. These episodes always occurred between 3 and 7 a. m., which was from nine to twelve hours after the evening meal. The duration of an attack had varied from one to thirty-six hours. There had been an average of from two to three attacks each month.

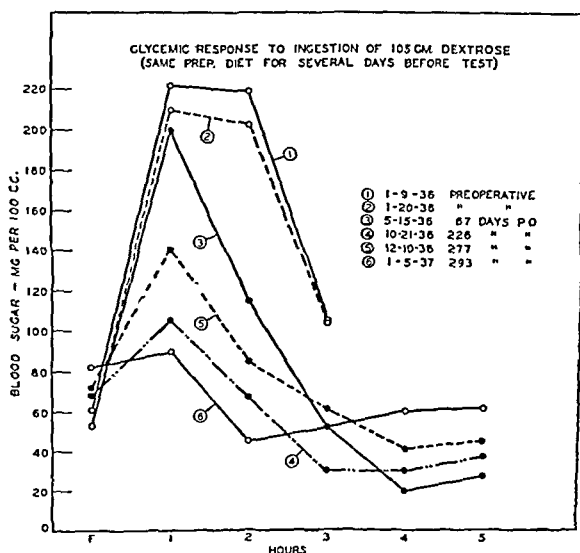


Chart 1 (case 1).—Hepatogenic hypoglycemia: Dextrose tolerance curves before and after cholecystectomy.

On Jan. 6, 1936, he was admitted to the University Hospital for study. Nothing of significance was found by physical examination. A dextrose tolerance test, after our standard preparatory diet,²⁰ gave the following response of the blood sugar: fasting 60 mg., one hour 220 mg., two hours 218 mg. and three hours 105 mg. per hundred cubic centimeters.

He was kept in bed and given a diet extremely low in carbohydrate (20 Gm. of carbohydrate, 50 Gm. of protein and 137 Gm. of fat). The following morning and for five successive mornings he was found disoriented and semicomatose or completely unconscious. The fasting blood sugar level each morning ranged from 14 to 18 mg. per hundred cubic centimeters. Prompt relief was obtained by administration of dextrose intravenously. One mg. of epinephrine subcutaneously was ineffective in relieving the attack or in raising the blood sugar significantly. No attacks occurred during the day.

Studies of the respiratory quotient⁶ indicated no overcombustion of carbohydrate, as would be expected in hyperinsulinism.²⁷ Our attention was next turned to the liver, although there was no clinical suggestion of hepatic disease.

Evidence of marked impairment of liver function is shown by the following results:

1. Bromsulphalein retention 90 per cent and 70 per cent (blood bilirubin 0.25 mg. per hundred cubic centimeters).
2. Greatly impaired galactose tolerance.

3. Positive urinary urobilinogen test.

4. Abnormally low total serum proteins, with inversion of the albumin-globulin ratio.

5. Marked macrocytosis of the red blood cells with normal hemoglobin.

A cholecystogram showed slight visualization of the gallbladder with suspected stones. X-ray examination of the skull, the neurologic examination and basal metabolic readings gave no positive results.

On March 9, 1936, a cholecystectomy was done. The pancreas was examined carefully and found to be grossly normal. The liver was of normal size, abnormally pale and granular, with surface nodules about 2 mm. in diameter. The gallbladder was distended and contained several large stones and from 60 to 90 cc. of thick yellow pus. Biopsy of the liver showed active chronic cholangiolitis leading to early biliary cirrhosis.

Chart 1 demonstrates the gradual return of the glycogenic function of the liver in the postoperative period. Since we had shown that the normal quantity of absorbed dextrose was being removed by combustion, we were forced to conclude that the preoperative delay in clearing the blood of dextrose was due to faulty glycogenesis in the liver. That this function slowly returned to normal postoperatively is indicated by the gradually increasing speed of clearance from the blood of absorbed dextrose. Note that, as time passed, the fasting blood sugar level rose from 51 to 81 mg. per hundred cubic centimeters, the patient having been eating the same diet for several days before each test.

The level of the serum proteins gradually returned to normal with a reversion to the normal albumin-globulin ratio. Simultaneously the response to the bromsulphalein, galactose tolerance and urinary urobilinogen tests became normal. The erythrocytic macrocytosis disappeared completely.

For thirteen months after operation the patient, having returned to work, carried on his normal activities in apparent good health without any suggestion of hypoglycemia. On April 1, 1937, he died of acute coronary occlusion.

CASE 2.—Organic hyperinsulinism. This case²⁸ reported by us is unique in that four islet cell adenomas were removed at operation and complete cure of the hypoglycemia resulted. Continuous metabolic studies over a six months period yielded many data, proving among other things tremendous overcombustion of carbohydrate. Of 174 determinations of blood sugar in the preoperative period fifty-seven fell between 12 and 35 mg. per hundred cubic centimeters.

A. S., a woman aged 59, white, a widow, had been in excellent health until January 1930 (almost ten years before admission), when "attacks" began. While in a trolley car on her way home from work at 6:30 p. m., she was roused at the end of the line by the conductor, who told her that she had been staring straight ahead and jerking her right arm. She managed to change cars and arrived home in a dazed state, perspiring profusely and having only a vague recollection of what had transpired since she had left her office. She was ravenously hungry, recalling that she had had no breakfast and only a light lunch. She ate heartily and within fifteen minutes was again perfectly well.

From then on she noticed that the omission or sometimes the delay of a meal would bring on a "nervous spell." Throughout the ten year period attacks came at the average rate of one or two a week with no increasing frequency but with a tendency to become more severe. For the first seven years most of the attacks had occurred between 5 and 6 p. m., but more recently they had come almost always between 10 a. m. and noon. There had never been an attack during the night or before breakfast.

On Nov. 14, 1939, she entered the University Hospital for study. Except for obesity the physical examination was negative. She was given a general diet, and two days later at 11:45 a. m. a typical attack was observed. The blood sugar during the attack was 24 mg. per hundred cubic centimeters. The attack was quickly terminated by the intravenous administration of 5 Gm. of dextrose. After a five day period of standard dietary preparation the dextrose tolerance test gave the following results: fasting 37 mg., one hour 95 mg., two

hours 47 mg., three hours 45 mg., four hours 43 mg. and five hours 56 mg. per hundred cubic centimeters.

Liver function was normal as indicated by bromsulphalein, hippuric acid and galactose tolerance tests. Blood bilirubin, serum proteins and red blood cells were normal. A cholecystogram showed faint visualization with probable stone.

Skull roentgenograms showed a normal pituitary fossa. The visual fields were normal. The basal metabolism rate was minus 7 per cent. A sodium restriction test²⁰ showed no evidence of decreased function of the adrenal cortex.

On the provocative low carbohydrate diet, fasting blood sugar values ranged from 21 to 37 mg. per hundred cubic centimeters but, except for mild headache, there were no attacks before breakfast. Typical attacks came on daily, however, with clocklike regularity between 11:15 a. m. and noon with blood sugar values between 14 and 35 mg. per hundred cubic centimeters.

Respiratory data indicated marked overcombustion of carbohydrate when compared with normals under the same conditions.²⁸

On Feb. 24, 1940, exploratory laparotomy was done. The liver was normal both grossly and microscopically (biopsy). It had a glycogen content of 5.5 per cent. At the junction of the distal and middle thirds of the tail of the pancreas a firm nodular area was felt. This area and all of the pancreas distal to it was resected and found to contain, deep in its substance, three separate and well encapsulated adenomas varying from 0.5 to 1.5 cm. in diameter. Sections revealed another of microscopic dimensions in the same region. The gallbladder, thickened and containing several pea sized stones, was removed.

Postoperatively a temporary period of hyperglycemia, glycosuria and ketonuria was observed. Over a period of two weeks the fasting blood sugar gradually became stabilized between 90 and 100 mg. per hundred cubic centimeters and subsequently remained there regardless of the diet (chart 2).

CASE 3.—Functional hyperinsulinism. This is the first case of three that we reported in introducing the use of a high protein diet in the treatment of this condition.

V. S., a girl aged 16 years, white, for two and one-half years had had periodic attacks of unconsciousness occurring once or twice a month. An attack usually began with visual disturbances followed by involuntary shaking of the extremities and irrational chattering. Unconsciousness frequently followed, lasting from five to fifteen minutes, sometimes associated with clonic convulsions. The attack would end rather abruptly, but mild disorientation and nausea remained for about an hour. The diagnosis elsewhere was epilepsy.

She was admitted to the University Hospital on Nov. 22, 1935. Physical examination revealed obesity without other abnormalities. The basal metabolic rate was minus 11 and minus 12 per cent. The visual fields and the pituitary fossa were normal. Dextrose tolerance tests gave the results seen in chart 3. No convulsion was observed in the hospital. However, when the blood sugar fell to 28 mg. per hundred cubic centimeters during a dextrose tolerance test she experienced the usual prodromal symptoms of an attack and said she was "about to have a fit," but none developed.

The fasting blood sugar level did not drop below 74 mg. per hundred cubic centimeters, regardless of the diet.

She was discharged with instructions to use a measured diet containing 110 Gm. of protein, 85 Gm. of carbohydrate and 135 Gm. of fat. In a six months follow-up period she experienced no convulsive attack. There had been, occasionally, however, the prodromal symptoms described.

DIFFERENTIAL DIAGNOSIS OF SPONTANEOUS HYPOGLYCEMIA

The Common Types.—When the possibility of hypoglycemia has not been kept in mind, a variety of erroneous diagnoses have been made. Among these are epilepsy, narcolepsy, intracranial tumor, diffuse disease of the brain or spinal cord, psychosis, psychoneurosis, neurasthenia and gastrointestinal disorders, particularly peptic ulcer.³⁰

Granting the presence of an abnormally low value for blood sugar at a time when the patient is experiencing symptoms, and the prompt disappearance of those symptoms on the administration of sugar, how may one attempt to arrive at an etiologic diagnosis?

1. **The Fasting Blood Sugar Level:** When the previous diet has been normal, depression of the post-absorptive blood sugar value (taken before breakfast) below 50 mg. per hundred cubic centimeters means organic hypoglycemia with but few exceptions. This condition is present in cases 1 and 2 and absent in case 3. Provocative tests (restriction of carbohydrate or fasting) designed to disclose an abnormally low level of the fasting blood sugar must be interpreted with care. By means of a diet low in carbohydrate for very short periods of time we³¹ have produced in normal people fasting levels ranging from 46 to 65 mg. per hundred cubic centimeters.³² If, by provocative means, the level is found below 40 mg. per hundred cubic centimeters, one is justified in concluding that organic disease is present.

Functional hyperinsulinism, on the other hand, is not associated with low levels of the fasting blood sugar,

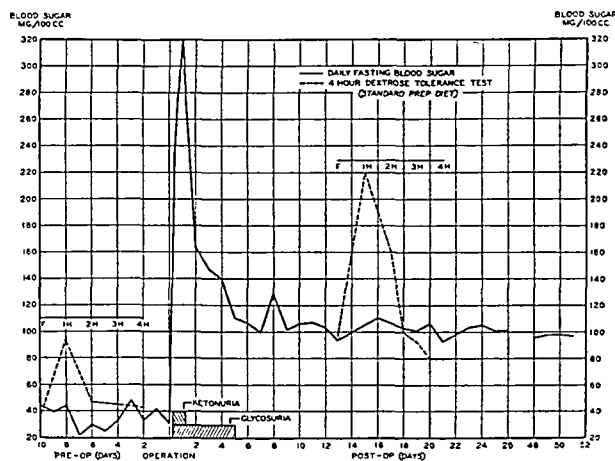


Chart 2 (case 2).—Organic hyperinsulinism: Preoperative and postoperative fasting blood sugar levels and dextrose tolerance curves.

depression of which by provocative tests is no greater than that produced in the normal individual. Thus the fasting blood sugar value is an aid in separating functional hyperinsulinism from the organic causes of spontaneous hypoglycemia.

2. **The Dextrose Tolerance Test:** Many writers have claimed that the dextrose tolerance test is of but little value in the differential diagnosis of the spontaneous hypoglycemias, citing as evidence the fact that all types of curves have been obtained in proved cases of organic hyperinsulinism; also that repeated tests in normal and diseased people show wide variations. We recognize the evidence but do not agree with the conclusions. It has been demonstrated repeatedly³³ that variations in the antecedent diet of the subjects affect profoundly the subsequent glycemic response to ingestion of dextrose. I²⁶ have proposed the use of a standard preparatory diet preceding the test. Wide variations are thus eliminated and much more comparable and reproducible curves result. Charts 4 and 5 show that in both organic and functional hyperinsulinism the character of the dextrose tolerance curve is significantly altered by variations in the carbohydrate content of the previous diet.

a 50 per cent chance that a pancreatic abnormality will be found at laparotomy." It seems from more recent statistics²³ that, with more rigid diagnostic criteria and more careful examination of the pancreas, an abnormality will be found in a much greater percentage (Whipple,³⁰ fifteen of eighteen cases in which operation was performed, 83 per cent).

When islet cell tumors have been found and removed, complete cure has resulted in the majority of cases. In several cases in which relief has not been obtained, a subsequent operation has revealed the presence of another adenoma, removal of which produced complete recovery. Many cases conforming roughly to the foregoing criteria have shown no apparent abnormality of the pancreas. In some of these a partial or subtotal pancreatectomy has been advised and done, with many disappointing results.⁴⁰ It must be recognized that the removal of a tiny adenoma has resulted in complete cure. Very small adenomas may be missed at operation. They may even be of microscopic dimensions (one of which was found in case 2). It is possible that very small tumors have been included in the resected pancreas of the cured cases and left behind in the uncured ones. A group of microscopic adenomas removed in a partial pancreatectomy could easily escape detection at pathologic examination unless many sections were made.

2. Indications for Cholecystectomy.—Excluding the usual indications for removal of the gallbladder, chronic hypoglycemia of hepatic origin may afford such an indication in selected cases. Case 1 is an excellent example of this situation. With no clinical suggestion of disease of the liver or of the gallbladder, the fasting hypoglycemia and the plateau type of dextrose tolerance curve (after standard dietary preparation) led to the finding of severely impaired liver function and the presence of active purulent cholecystitis. Removal of the source of the ascending hepatitis allowed a return of normal liver function and clinical cure of the hypoglycemic state. In contrast to chronic hepatic hypoglycemia due to progressive destructive lesions of the liver, which are universally fatal, this type can be helped greatly by removing the source of the hepatitis. Indications for operation are:

1. Postabsorptive hypoglycemia markedly intensified by restriction of dietary carbohydrate.
2. Postprandial hyperglycemia with intermittent glycosuria.
3. Hyperglycemic plateau type of dextrose tolerance curve with abnormally low fasting level.
4. Evidence of impaired function by other tests.
5. Evidence of a diseased gallbladder by cholecystography.
6. Presumptive elimination of other causes of chronic degenerative and destructive lesions of the liver.

MEDICAL MANAGEMENT

1. Organic Hyperinsulinism.—Medical treatment is notoriously unsuccessful in controlling this condition. When the diagnostic criteria that have been outlined have been met, operation should be urged since there is roughly a 75 per cent chance that a tumor will be found. When operation is refused it becomes necessary to feed a diet high in carbohydrate, giving meals as frequently as is required to prevent attacks. This leads to obesity and makes a subsequent operation more severe and postoperative complications more likely. Severity may progress to a point at which continuous intravenous dextrose is necessary to maintain the blood sugar above hypoglycemic levels.

Epinephrine: We²⁸ have found that the addition of epinephrine (1 mg. subcutaneously twice daily) to a dietary regimen which produced from three to four hypoglycemic convulsions daily prevented entirely the occurrence of attacks and kept the blood sugar above the attack level. In addition, we found that the rise in blood sugar produced by epinephrine was not associated with increased oxidation of carbohydrate. When a similar rise in blood sugar is produced by the ingestion of dextrose, a marked increase in the combustion of carbohydrate invariably occurs. The results are not surprising, since Cori and his co-workers,⁴¹ Colwell and Bright⁴² and others have found in animals that carbohydrate combustion is completely suppressed by the continuous injection of epinephrine. Our results with epinephrine in normal human beings afford similar conclusions.⁴³ It is probable that the subcutaneous administration of epinephrine in oil may be a valuable adjunct in the treatment of cases in which operation is refused or in those cases in which operation does not bring relief.

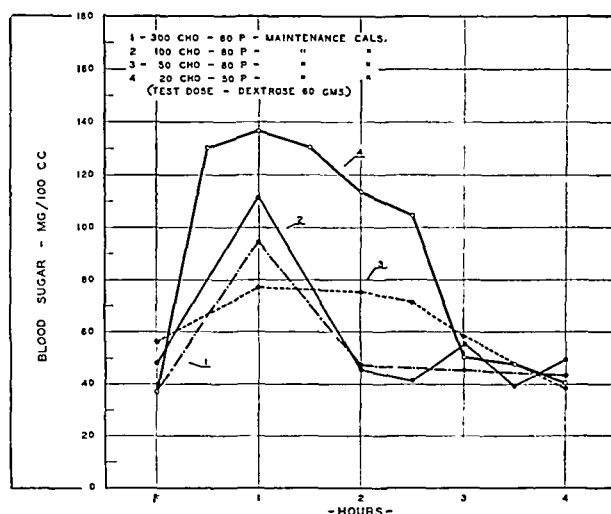


Chart 4.—Organic hyperinsulinism: Effect of previous diet on dextrose tolerance curve.

Ephedrine: The use of ephedrine has been only mildly effective and has failed to prevent attacks.

Adrenal Cortex Extracts: The possible effectiveness of this material in hyperinsulinism is suggested by the work of Jensen and Gratton⁴⁴ indicating the prevention of insulin convulsions in mice by previous administration of adrenal cortex extract and by the work of Britton and Sylvestre,⁴⁵ Long⁴⁶ and others.⁴⁷ In case 2 the intramuscular administration of 30 cc. of adrenal cortex extract⁴⁸ daily (from four to five times the amount usually required to control Addison's disease) was ineffective in raising the blood sugar level and in preventing attacks. Simultaneous sodium and nitrogen balance studies indicated the potency of the extract used. It is likely that commercial extracts now available contain only small amounts of the "carbohydrate factors" (Kendall's fraction E and so on) of the adrenal cortex and that the future may bring better success with this form of therapy.

Anterior Pituitary Hormones: The experimental work of Young⁴⁹ and of Campbell and his co-workers⁵⁰ suggests that the use of insulin antagonists (diabetogenic and glycotropic factors) produced in the anterior pitui-

tary gland would be of benefit. Such extracts are not available commercially. Young⁵¹ feels that diabetogenic hormone given in sufficient quantity to alter insulin production would cause complete destruction of all insular tissue and result in diabetes mellitus.

2. *Functional Hyperinsulinism*.—Into this group falls by far the greatest number of cases of spontaneous hypoglycemia, the characteristics of which have been

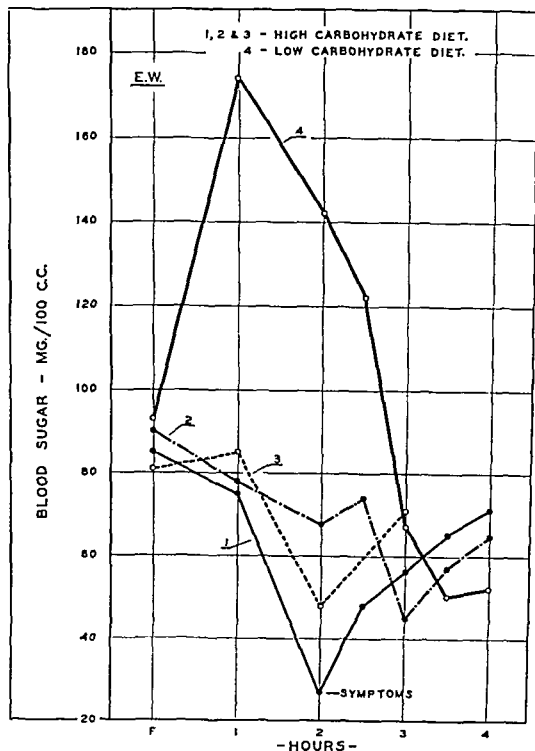


Chart 5.—Functional hyperinsulinism: Effect of antecedent diet on dextrose tolerance test.

described. Here the response to dietary regulation is usually good. Early in the development of diet therapy for these patients it was noted that diets high in carbohydrate resulted frequently in an increased number of attacks of greater severity. It was soon suggested that the postprandial rise of blood sugar associated with the ingestion of large amounts of easily absorbed carbohydrate afforded an added stimulus to insulogenesis with a resultant secondary abrupt fall of the blood sugar to hypoglycemic levels. Thus the oral administration of sugar would quickly alleviate a hypoglycemic episode but would be followed shortly thereafter by another attack, often more severe than the first. A similar situation can be produced in normal people⁵² but it is of less intensity.

In an attempt, therefore, to prevent the postprandial rise in blood sugar with its subsequent secondary fall, Waters⁵³ proposed a frequent feeding schedule, using a diet low in carbohydrate and high in fat. On this regimen the patients were much improved but continued to have periodic attacks. John,⁵⁴ attempting to prevent the postprandial rise in blood sugar, gave small doses of insulin shortly after meals. He found that the secondary hypoglycemia could be prevented thus and reported good clinical results. In 1936 I³⁸ reported experimental and clinical evidence indicating that a diet high in protein and low in carbohydrate is beneficial in these cases and that such a diet could be given on a three meal schedule. We⁵⁵ had found that in both normal and

diabetic persons the ingestion of large amounts of protein is followed by little or no rise in the blood sugar. Yet protein during its metabolism yields approximately 50 per cent of its weight as dextrose. When an equivalent amount of dextrose is ingested, as such or as carbohydrate food, a significant hyperglycemia is produced. Similar results were obtained in cases of functional hyperinsulinism, an example of which is shown in chart 6. The therapeutic effectiveness of the high protein diet is due to (1) the slow even rate at which dextrose is derived from protein, resulting therefore in no elevation of the blood sugar and consequently no secondary fall, and (2) the long period required for the absorption of protein and its conversion to dextrose, thus affording a slow steady supply of dextrose over a prolonged period of time.

We have had continued success with this type of treatment, with the occasional addition of a protein meal at bedtime. The average diet contains from 120 to 140 Gm. of protein, from 50 to 75 Gm. of carbohydrate and maintenance calories. Wilder²³ reports that at the Mayo Clinic best results have been obtained on a similar regimen, about 2 Gm. of protein per kilogram of body weight being prescribed.

3. *Hepatogenic Hypoglycemia*.—Except for cases of chronic hypoglycemia associated with infectious hepatitis in which surgical removal of the source of the hepatitis can be accomplished, treatment of hypoglycemia of hepatic origin is necessarily medical. In acute degenerative lesions of toxic origin the frequent or continuous administration both orally and parenterally of large amounts of carbohydrate serves a dual purpose: 1. It prevents the fasting hypoglycemia. 2. It aids in the regenerative process of the injured parenchymatous cells.⁵⁶ In progressive, chronic, destructive and degenerative lesions of the liver the attending hypoglycemia is controlled by the frequent administration of carbohydrate. A meal high in carbohydrate before retiring will frequently control the hypoglycemia found before

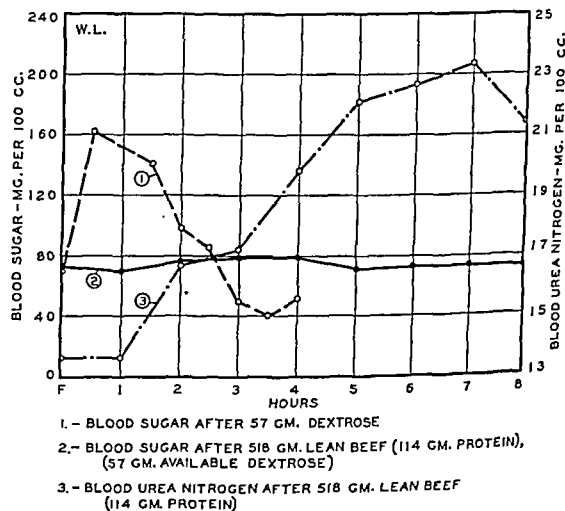


Chart 6.—Glycemic response to isoglucogenic quantities of dextrose and protein.

breakfast. In addition, the inclusion in the diet of foods high in protein is probably of value. Recent work⁵⁷ indicates a protective action on the liver of diets high in protein. The ability of the liver to deaminate and metabolize amino acids appears to be normal up to the very last stages of hepatic insufficiency.

4. *Pituitary and Adrenal Hypoglycemia and Renal Glycosuria.*—As noted before, the insufficiency in commercially available pituitary and adrenal extracts of the factors necessary to prevent insulin hypoglycemia eliminates the possibility of specific therapy at this time. Similarly there is no method available with which to raise the renal threshold for dextrose. A dietary schedule which includes frequent feedings high in carbohydrate is usually sufficient, however, to control the hypoglycemia.

ABSTRACT OF DISCUSSION

DR. HERBERT POLLACK, New York: Dr. Conn's work in the hypoglycemias has been appearing in the literature for about four years. It was Dr. Conn who, with Dr. Newburgh, first called attention to the use of the high protein diet in the therapy of the hypoglycemias. They pointed out that the carbohydrate available from the protein was liberated slowly over a period of time, thus preventing the drop in blood sugar during the night fast. It was this concept that led me to my employment of the high protein evening meal for the diabetic patient, using protamine zinc insulin. The nocturnal blood sugar curves of these patients resembled those of a patient with mild hypoglycemia. Dr. Conn made the statement that the rapidity of the blood sugar drop was important in the production of the hypoglycemic symptoms. This must be emphasized again. Daily one sees the reactions from protamine zinc insulin as being entirely different from those observed from the unmodified insulin, largely because the changes from the former are slow and from the latter rapid. I need not discuss at this point the possibility of certain of the symptoms of hypoglycemia such as trembling, tachycardia or blanching of the skin as being due to secondary discharge of epinephrine and other symptoms such as drowsiness, visual disturbances and coma as being due to hypoglycemia per se. The case illustrating the hepatogenic type of hypoglycemia is of especial interest to me. Dr. Lande and I reported three somewhat similar cases five years ago from a different point of view. We showed the diabetic type of dextrose tolerance curve associated with biliary tract disease which returned to normal postoperatively. Two of the patients had hypoglycemic episodes. We pointed out the caution necessary in using insulin postoperatively in certain "diabetic" patients after gallbladder surgery. Dr. Conn points out one of the significant differential points in the diagnosis of the etiology of hypoglycemia, that is the effect of the antecedent diet on the dextrose tolerance curve. This has been recognized for years in the so-called hunger diabetes. More important is the profound effect of low carbohydrate diets on the functional hypoglycemias as compared to the slight effect on the organic hypoglycemias. It is important to point out that the cause of hypoglycemia is the rapid drop after a rapid rise in blood sugar concentration. Samogi and Dolger and I have pointed out this exaggerated response in normal persons and in diabetic patients. We emphasized that many of the insulin shocks seen in diabetic patients occur after a period of hyperglycemia and glycosuria.

DR. E. J. KEPLER, Rochester, Minn.: It is important to differentiate hypoglycemia and hyperinsulinism. The former refers to the fact that the concentration of the blood sugar is subnormal, the latter to a specific form of hypoglycemia which results from an excessive production of insulin. Failure to make this distinction has been the cause of diagnostic and therapeutic errors. Recently there has been a tendency to diagnose "hyperinsulinism" on inadequate evidence. Disabling hyperinsulinism and spontaneous hypoglycemia are rare conditions. In contrast, however, there are many individuals who experience unpleasant sensations before mealtime. In some cases the concentration of the blood sugar may be found to be at low normal levels, 70 mg. per hundred cubic centimeters, for example. If such an individual happens to be hypersensitive or is neurotic, an erroneous diagnosis of "hyperinsulinism" frequently is made. Often this diagnosis precipitates an anxiety neurosis that becomes more of a problem than the symptoms for which medical advice was sought. In the main I agree with Dr. Conn's classification

of the hypoglycemic states. In addition to those conditions which he has mentioned, we at the Mayo Clinic have encountered severe hypoglycemia of an indeterminate origin. In these cases severe hypoglycemic episodes continued to occur after practically all pancreatic tissue had been removed by one or more operations. Furthermore, in at least two instances with which I am familiar an adequate basis for the occurrence of the hypoglycemia could not be demonstrated at necropsy. This form of spontaneous hypoglycemia often is refractory to every known form of therapy; consciousness can be maintained only by the ingestion of food at intervals of four hours throughout the day and night, and eventually mental deterioration may occur, presumably because of repeated hypoglycemic insults to the central nervous system. It has become traditional to include hypopituitarism among the causes of hypoglycemia. Actually, hypoglycemic symptoms are rarely encountered in cases of anterior pituitary insufficiency. Subnormal concentrations of the blood sugar or flat dextrose tolerance curves may be obtained in cases of Simmonds' disease or chromophobe tumors of the pituitary body, but almost always the hypoglycemia is asymptomatic. The same remarks apply to the functional counterpart of anterior pituitary insufficiency; namely, anorexia nervosa.

DR. G. M. CHURUKIAN, Paris, Ill.: During the past two years I have done dextrose tolerance tests on patients complaining of dizziness, faint feeling, extreme nervousness and so on, exaggerated by high carbohydrate food intake. There were two types of patients: the obese diencephalic type and the asthenic type. Dextrose tolerance curves on the diencephalic type were close to the diabetic type in climbing high the first half hour. However, they manifested a sudden drop in one hour far below normal, to 40 or 50, while in the asthenic type the curves were of the flat type and usually below the base line. These patients were treated with high fat and high protein and low carbohydrate diet. The obese were given 125 Gm. of fat and from 60 to 70 Gm. of protein and the asthenic were given from 125 to 150 Gm. of fat and from 70 to 80 Gm. of protein. After three or four weeks the dextrose tolerance tests were rechecked. Almost all of these revealed more or less normal curves with relief of hypoglycemic symptoms.

DR. JEROME W. CONN, Ann Arbor, Mich.: The type of case to which Dr. Churukian refers probably belongs in the group which I have classified as functional hyperinsulinism. It should be stressed again that this type of transitory, symptomatic spontaneous hypoglycemia is the most common form encountered. It represents merely a more intense response to insulogenic stimulation than is exhibited by the average normal person. Thus the prevention of postprandial hyperglycemia in these "hyper-reactors" lessens the secondary, stimulative hypoglycemia which would otherwise occur. When a low carbohydrate diet intensifies the hypoglycemia, an etiology other than functional hyperinsulinism should be sought. Many errors in interpretation of the dextrose tolerance test will occur unless the subject has been eating a standard preparatory diet for at least three days before the test is done.

Curiosity May Be Disastrous.—Man's inherent and compelling curiosity, when well directed, has led to scores of important discoveries having far-reaching beneficial effects on man and beast alike, Dr. John R. Mohler, chief of the U. S. Bureau of Animal Industry, said in an address at the bicentennial celebration of the University of Pennsylvania. But curiosity about disease organisms may also result disastrously to man. When a stock raiser, for instance, finds a cow dead, apparently from anthrax, it is dangerous to open the animal's carcass in search of evidence of the disease. The body fluids of an animal dead from anthrax are full of dangerous bacilli, and a postmortem examination by one who does not know exactly what precautions to take may result fatally to the examiner. The U. S. Department of Agriculture warns emphatically against postmortem examination of animals that may have died from diseases dangerous to man, Dr. Mohler says. Leave this form of curiosity to veterinarians and stockmen experienced in this work.—Clip Sheet, U. S. Department of Agriculture, Oct. 20, 1940.

SERUM TREATMENT OF PNEUMOCOCCIC PNEUMONIA

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In July 1938, when the plans for this study of pneumonia were being formulated, two new therapeutic agents had just been reported. The first was unconcentrated antipneumococcus rabbit serum, reported by Horsfall, Goodner, MacLeod and Harris in May 1937.¹ The second was sulfapyridine, reported by Whitby on May 28, 1938.² At this time there had been no clinical experience with sulfapyridine in this country. On the other hand, there had been extensive experience with serotherapy for many years and the principles of treatment were well established.

In January 1938 the Bureau of Pneumonia Control of the New York State Department of Health supplied the Strong Memorial Hospital with nearly all the thirty-two types of therapeutic and all the thirty-two types of diagnostic rabbit serums for experimental purposes. Since the supply of horse serum of types I and V was ample and the results had been favorable in previous years, only patients sensitive to horse serum of these types were treated with rabbit serum in this series.

The preliminary results with the use of rabbit serum in the six month period January to July 1938 were favorable, so that when this study began rabbit serum was given preference over all other forms of specific treatment.

For the first eight months of this study (July 1938 to March 1939) no type III rabbit serum was available. Therefore, when sulfapyridine was supplied for experimental purposes by a commercial firm in the fall of 1938, it was felt that pneumonia due to the type III pneumococcus would provide an excellent test of its efficacy, since the mortality rate in the Strong Memorial Hospital for twelve years had averaged 45 per cent for lobar pneumonia caused by this type.

Because of the numerous complicating factors in pneumonia and the resulting difficulties in evaluating therapeutic measures, it was considered wise to use the new agents separately rather than in combination. Therefore, in this series all patients, with rare exceptions, received either serum or sulfapyridine therapy. Only those with the type III pneumococcus and those who were sensitive to serum or were allergic received sulfapyridine. The majority of patients were treated with either rabbit or horse serum. All patients received the same kind of general care and supportive measures as indicated.

This method of selecting cases simplifies and increases the accuracy of evaluating the results of specific therapy. Because there were only forty-three patients treated with sulfapyridine alone, it was decided to withhold the report on sulfapyridine until a later date, when more cases have been studied.

From the Department of Medicine, University of Rochester School of Medicine and Dentistry, and the Medical Clinics of the Strong Memorial and Rochester Municipal hospitals.

This report is part of a cooperative study of antipneumococcus serum made possible by the Bureau of Pneumonia Control of the New York State Department of Health, which has furnished the serums.

1. Horsfall, F. L., Jr.; Goodner, Kenneth; MacLeod, C. M., and Harris, A. H., Jr.: Antipneumococcus Rabbit Serum as a Therapeutic Agent in Lobar Pneumonia, *J. A. M. A.* 108: 1483 (May 1) 1937.

2. Whitby, L. E. H.: Chemotherapy of Pneumococcal and Other Infections with 2-(p-Aminobenzenesulfonamido) Pyridine, *Lancet* 1: 1210 (May 28) 1938.

OUTLINE OF THE PROGRAM OF STUDY

Selection of Patients.—All patients with pneumonia due to type II or higher types of the pneumococcus were treated with rabbit serum, with a few exceptions.

All patients with type III pneumonia due to the pneumococcus received sulfapyridine therapy.

All patients with pneumonia due to pneumococci of types I and V were treated with horse serum unless sensitive to horse serum.

Only exceptional patients received both serum and sulfapyridine. These are excluded from the present series unless they were given sulfapyridine first and failed to respond. A small group of infants who were treated with sulfapyridine first and failed to respond after forty-eight hours' trial were given serum; they are included in this report.

Routine Procedures for Serum-Treated Patients.—A complete history, physical examination, blood count, urinalysis and stool examination were made.

A history of allergy or of previous serum treatment was obtained.

Cutaneous and ophthalmic tests with normal horse and rabbit serums were performed.

Sputum was typed directly by the Neufeld quellung technic and cultured on a blood agar plate, and mouse inoculations were made in each case. A second specimen of sputum was retyped, and a pure culture of pneumococci was forwarded to the Health Bureau Laboratories in Albany, N. Y., for verification.

Blood was taken for culture prior to serum treatment, and repeated cultures were made daily while the patient was febrile.

X-ray examination of the chest was made in 90 per cent of the cases.

Routine determinations of the nonprotein nitrogen content of the blood, the plasma chlorides and the icterus index were made.

Special Studies.—Serum Antibodies: Three methods of determining the presence of circulating antibodies were used: (1) serum agglutinin titration, (2) determination of serum capsular-swelling antibodies and the (3) Francis skin test. All three tests were made in the majority of cases and were repeated at frequent intervals during the period of hospitalization.

Serum Complement Determinations: These tests were performed prior to treatment and repeated at frequent intervals in conjunction with the antibody studies.

PRINCIPLES OF TREATMENT AND CONTROL OF SERUM DOSAGE

In cases suitable for serum therapy as determined by a negative history of allergy and negative sensitivity reactions, a general plan of treatment was formulated in advance. In their original article on the use of unconcentrated rabbit serum, Horsfall, Goodner, MacLeod and Harris¹ stated that the average dose in their cases was 159 cc. In the beginning of this series this amount was used as a rough guide for initial doses. This was the amount of serum given in the average uncomplicated case, that is, to a patient with any type of pneumococcus other than type II, who was 40 years of age or less, and had involvement of only one lobe, a negative blood culture and disease of less than three days' duration. Larger initial doses were given in cases in which additional factors were present which are known to increase the mortality rate. These include age above 40, type II pneumococcus infections, involve-

ment of more than one lobe, alcoholism, pregnancy and duration of the disease of more than three days. In addition, patients presenting marked toxicity and a positive reaction to the urine precipitin test were treated with a projected dose as large as that which would have been given in the presence of bacteremia (see later portion of section). This was done because, as Cruickshank³ has shown, the disease in cases presenting such a picture is more severe and the mortality rate is many times higher than in similar cases in which the precipitin test is negative.

Subsequent dosage was guided by two main factors, namely clinical response and development of excess demonstrable serum antibodies. The rationale for considering the factor of excess antibody is based on the experiments of Robertson,⁴ who showed that for the resolution of the pneumonic process the macrophages, which are largely responsible, require the presence of specific antibody for phagocytosis, just as do the polymorphonuclear cells in the early stages of the disease. It has been shown that, once an excess serum titer has been established, it persists for from seven to fourteen days. Observations made in series verify this work.

In cases in which good clinical response occurs to the projected dose it is important to determine whether excess serum antibody is present. If it is, further serum treatment is superfluous. If there is no demonstrable serum antibody or if the reaction to the Francis test is negative, it is likely that without additional serum treatment a relapse or slow resolution will follow. Therefore, in cases in which there was a good clinical response but demonstrable serum antibodies failed to develop, additional serum was given until a definite level of antibody was present. Generally this required only small doses of serum, from 20 to 60 cc.

Cases in which there was no response to the projected dose of serum after twelve to eighteen hours were studied in an attempt to determine the cause of serum failure. These additional points were checked in each case at this time:

Blood Culture.—Patients with bacteremia were given additional serum, even when the clinical response was favorable.

Sputum Typing.—Retyping the sputum provided the answer to apparent serum failure in several cases, especially in those in which more than one type of pneumococcus was isolated from the sputum. Culture of the sputum was valuable in the diagnosis of cases of pneumonia due to *Staphylococcus aureus*, a hemolytic streptococcus and Friedländer's bacilli, in which a pneumococcus was found in the initial typing by the Neufeld technic.

Physical Examination.—The most common physical manifestations causing apparent serum failure were pleural effusion and spread of the process to another lobe. No cases of empyema were seen in this series.

Serum Antibody Study and Francis Skin Test.—These tests were of about equal value in guiding subsequent dosage. In several cases of initial serum failure, inadequate dosage was found to be the cause. This was determined by the presence of a negative blood culture, failure to demonstrate serum antibodies

or a negative Francis skin test, verified typing of the sputum and elimination of physical causes for serum failure.

Blood Complement Determination.—The value of blood complement determination appeared in cases in which there was no cause for serum failure after the aforementioned points had been checked. In this series, six patients who failed to respond to adequate and specific serum therapy were found to be deficient in serum complement. These patients were given fresh normal human serum in 200 to 400 cc. doses and responded by crisis within twenty-four hours. It is believed that further study of this factor in pneumonia and other infectious diseases may prove fruitful. The rationale for this feature of treatment is that complement speeds the rate of phagocytosis of sensitized bacteria.

TECHNIC OF SERUM ADMINISTRATION

Prior to intravenous therapy, sensitivity tests—cutaneous, ophthalmic and intravenous—were performed on all patients according to the methods used by Horsfall, Goodner, MacLeod and Harris.¹ Undiluted serum was administered by the syringe method in 40 to 100 cc. doses at the rate of 2 to 4 cc. a minute. The first therapeutic dose was usually 40 cc. or less. If no reaction occurred after such a dose, the rest of the projected amount of serum was given in the next dose unless this amount was more than 120 cc. In such instances two or more injections were given at one to two hour intervals.

TESTS USED IN THE CONTROL OF SERUM DOSAGE

1. **Francis Skin Test.**—Purified pneumococcus polysaccharide substance was supplied by the New York State Laboratories for types I, II, V, VII and VIII. The test was performed prior to treatment in all cases because it has been shown⁵ that a definite group of patients give a false positive reaction: in such cases the test is of no value. A positive reaction consists of an area of erythema from 2 to 5 cm. in diameter plus the formation of a definite wheal at the site of injection appearing during the first hour after injection, and usually within twenty to thirty minutes. In some cases the reaction became positive after the first or second therapeutic dose of serum. In general, a positive Francis cutaneous reaction coincided with the development of excess serum antibodies. In a few cases positive cutaneous reactions never developed, although agglutinins were present in the serum and recovery occurred. However, in no case were a positive reaction to the Francis test and a negative agglutination reaction found. Therefore, a Francis skin test negative before treatment becoming positive after treatment is a reliable test for the presence of excess circulating antibody in cases of types I, II, V, VII and VIII pneumonia.

2. **Serum Antibodies.**—Serum agglutinin titrations and capsular swelling antibody determinations were done in a large percentage of cases. These two tests were run simultaneously in the following manner:

An autogenous antigen was prepared from each patient. The peritoneum of a mouse was inoculated with the patient's sputum, and the exudate was aspirated within four to twelve hours. This exudate was sus-

3. Cruickshank, Robert: Urinary Excretion of Pneumococcus Polysaccharide in Lobar Pneumonia, *J. Path. & Bact.* **46**: 67 (Jan.) 1938.

4. Robertson, O. H.: Recent Studies on Experimental Lobar Pneumonia; Pathogenesis, Recovery and Immunity, *J. A. M. A.* **111**: 1432 (Oct. 15) 1938.

5. MacLeod, C. M.; Hoagland, C. L., and Beeson, P. B.: The Use of the Skin Test with the Type Specific Polysaccharides in the Control of Serum Dosage in Pneumococcal Pneumonia, *J. Clin. Investigation* **17**: 739 (Nov.) 1938.

pended in saline solution and centrifuged at low speed for two to three minutes to throw down the white blood cells and debris. The supernatant fluid containing pneumococci was then stained with methylene blue and kept in air tight bottles. The agglutination and capsular swelling tests were done simultaneously by the slide method. A drop of the patient's serum, obtained by venipuncture, was mixed with a drop of the stained suspension of pneumococci. The mixture was incubated at 37 C. for one-half hour and read. Three additional dilutions of serum, 1:5, 1:10 and 1:20, were prepared and mixed with the antigen, incubated and read, as in the case of the undiluted serum. When the patient's serum had a considerable excess of antibody, the agglutination and capsular swelling reactions occurred almost immediately. It was

was that dilution which gave complete hemolysis. Fresh sensitized sheep cells were obtained daily from the Wassermann laboratory. All tests were performed within two hours after the specimens had been obtained.

RESULTS OF TREATMENT WITH HORSE SERUM

Thirty-five patients were treated with concentrated horse serum supplied by the New York State Department of Health, in the same manner and with the same controls as the series of sixty-five patients given rabbit serum. There were three deaths. The relative response to treatment, the serum reactions, the dosage and other factors observed in this series are compared in the accompanying table with similar observations for the rabbit serum treated patients.

COMMENT

From the data recorded in this series of 100 cases of proved, typed pneumococcic pneumonia, it appears that both antipneumococcus horse and rabbit serums are valuable therapeutic agents. The number of cases is too small to form a basis for definite conclusions as to the relative curative value of the two agents. However, it appears so far that unconcentrated rabbit serum is superior in regard to its relative freedom from reactions. There was a collapse reaction in only one of sixty-five cases. The patient responded to treatment with appropriate measures. The frequency of febrile reactions was almost four times less with unconcentrated rabbit serum than with horse serum. Of the sixty-five cases in which rabbit serum was used, severe serum disease developed in only four, and in sixteen cases the disease was mild, lasting only one to three days and responding readily to symptomatic treatment.

No control cases were used in this series. However, prior to 1938 specific therapy was available only for pneumonia of types I and II, and the data for these and other types have been gathered and interpreted by Dr. Sidney Rothbard and Miss Priscilla Cummings, of these hospitals. The gross mortality for pneumococcic lobar pneumonia for 1926 to 1936 was 40.5 per cent. This included 111 cases of type I pneumonia in which horse serum was employed, with a mortality rate of 26 per cent. When the cases of type III pneumonia were excluded, the mortality rate in their series of 645 cases was still 38 per cent.

Therefore, it is felt that the mortality rate of 5 per cent in this series, cases of type III in which sulfa-pyridine was used being excluded, represents the effect of adequately controlled serum treatment. It is realized that the incidence of bacteremia of 19 per cent is slightly lower than in previous years (the average for 1926 to 1936 being 24 per cent) and probably contributes to the low mortality rate. Even under such circumstances the other factors present in this series, such as an average age of 45, multiple lobe involvement in 36 per cent of the cases, heart disease in 18 per cent and alcoholism in 13 per cent, should have produced a mortality rate of 30 per cent or more if specific treatment had been withheld. Therefore it is felt that serum treatment has reduced the mortality rate at least sixfold and has not been responsible for a single death.

SUMMARY OF THE FIVE FATAL CASES

CASE 1.—R. B., a man aged 52, known to be chronically alcoholic, entered the hospital on the tenth day of type I lobar pneumonia, which involved the entire right lung. He was in desperate condition, with extreme cyanosis, dyspnea and gross distention. He was treated with 350,000 units of type I horse serum during the first thirty-six hours after his admission.

*Comparison of Results of Treatment of Pneumonia with Rabbit and with Horse Serums**

Critical Factors	Rabbit Serum	Horse Serum
Number of cases.....	65	35
Mortality.....	2 cases (3%)	3 cases (8.5%)
Average age.....	45.2 yr. (exclusive of 5 infants)	44.4 yr.
Lobes involved.....	1 lobe, 41 cases 2 lobes, 22 cases 3 lobes, 2 cases 4 lobes, 0 case	1 lobe, 23 cases 2 lobes, 10 cases 3 lobes, 1 case 4 lobes, 1 case
Day of disease treatment was started	1st day, 28 cases 2d day, 16 cases 3d day, 7 cases 4th day, 7 cases 5th day, 3 cases 6th day, 3 cases 7th day, 1 case	1st day, 8 cases 2d day, 13 cases 3d day, 2 cases 4th day, 5 cases 5th day, 1 case 6th day, 5 cases 10th day, 1 case
Incidence of bacteremia.....	9 cases (13.8%)	10 cases (28%)
Average dose of serum.....	186 cc.	133 cc.
Incidence of alcoholism.....	7 cases (10.7%)	6 cases (17.1%)
Incidence of heart disease.....	12 cases (18.4%)	6 cases (17.1%)
Immediate serum reactions....	8 cases (12.3%)	16 cases (45.7%)
Incidence of serum disease....	20 cases (30.8%)	15 cases (42%)
Clinical response to serum treatment		
Crisis 12 hr.	31 cases	17 cases
Crisis 24 hr.	18 cases	7 cases
Crisis 48 hr.	6 cases	3 cases
None.....	1 case	2 cases
Lysis.....	9 cases	5 cases
Incidence by type of organism		
Type I.....	8 cases	18 cases
Type II.....	8 cases	1 case
Type IV.....	0 case	3 cases
Type V.....	6 cases	1 case
Type VI.....	1 case	1 case
Type VII.....	8 cases	5 cases
Type VIII.....	5 cases	3 cases
Type XIV.....	4 cases	1 case
Type XIX.....	.....	1 case
Higher types.....	25 cases	.....

* One cc. of concentrated horse serum contains 2,500 units; 1 cc. of unconcentrated rabbit serum contains approximately 2,000 units.

found that either an agglutinin or a quellung titer of 1:20 or more was an indication of sufficient serum therapy. Excess antibodies determined by this method persisted generally for at least ten days, and in some cases as long as a month. This technic of serum antibody determination has the advantage of simplicity over the macroscopic agglutination method and is accurate enough for practical purposes.

3. *Blood Complement Determination.*—Blood complement was measured by the serial dilution method, as used by the New York State Laboratories in Wassermann determinations. It was found that the amount of serum of normal persons necessary to hemolyze 0.2 cc. of a 2.5 per cent suspension of sheep cells incubated at 37 C. in the water bath for fifteen minutes was 0.01 to 0.02 cc. In the cases of pneumonia dilutions containing 0.01 to 0.05 cc. of the patient's serum were used in the aforementioned manner and read. The end point

His temperature returned to normal in eighteen hours, and excess antibodies were demonstrated in the blood serum. Repeated blood cultures were sterile, but the patient remained ill. Distention and delirium were the main therapeutic problems. The distention was finally controlled by intravenous injection of saline and dextrose solution, prostigmine, enemas, stupes and Wangenstein suction. The delirium failed to respond to intravenous administration of dextrose, saline solution, sedatives, and large doses of vitamin B₁.

Twenty-four hours before death the temperature, which had been normal for five days, became elevated, and sputum on retyping revealed pneumococcus types VIII and XIX, in addition to the original type I. Rabbit serum treatment for the higher types was withheld because there was no spread of the pneumonia and it was thought that the fever might be due to beginning serum disease. One hour before death the patient became comatose and slight stiffness of the neck developed. Lumbar puncture revealed sterile fluid under moderately increased pressure. A blood culture taken at this time revealed type VIII pneumococci. Postmortem punctures of the lung revealed the same organism. Permission for autopsy was refused.

This is the type of case in which there might well have been a favorable response to the combined use of serum and sulfapyridine.

CASE 2.—F. T., a man aged 64, entered the hospital on May 4, 1939, with congestive heart failure due to hypertensive and arteriosclerotic heart disease. He responded well to digitalis and diuretics. On May 10 fever, cough, bloody sputum and pain developed in the left side of the chest. Twenty-four hours later he had signs of pneumonia in the lower portion of the left lung, and type I pneumococci were found in the sputum. A blood culture taken on May 12 yielded type I pneumococci. On the same day he received 300,000 units of type I horse serum in five doses. The vital signs, except for the pulse rate, returned to normal in twenty-four hours. A blood culture taken on May 13 was sterile. The patient became delirious, circulatory collapse developed and he died four days after the onset of the pneumonia. Determinations of blood antibodies were not made, but the Francis test remained repeatedly negative. Autopsy revealed type I pneumonia in the lower lobe of the left lung, early empyema and arteriosclerotic heart disease with congestive failure.

In retrospect, the cause of continued toxicity after serum treatment was the empyema, which must have developed on the second or third day of the pneumonia. This also explains the persistently negative reaction to the Francis test.

CASE 3.—C. N., a man aged 26, known to be epileptic, was admitted to the hospital on the sixth day of type I pneumonia, which involved the entire right lung and the lower lobe of the left lung. A total of 450,000 units of horse serum was administered during the thirty-six hour period after admission. Repeated blood cultures were sterile. There were no serum reactions. One hour after the first dose of serum the patient had a severe epileptic convulsion, lasting thirty minutes, which was followed by pulmonary edema. Symptomatic measures and sulfapyridine failed to alter the course of the disease. The patient died on the eleventh day of the disease with involvement of all five lobes of the lungs and pulmonary edema.

CASE 4.—C. B., a man aged 48, known to be chronically alcoholic, with rheumatic heart disease of class 2b, was admitted to the hospital twenty-four hours after the onset of type II pneumonia, which involved the lower lobe of the right lung. On admission the blood culture yielded 10 colonies per cubic centimeter, and the initial white blood cell count was 7,600. He was given 200 cc. of rabbit serum in four doses on the day of admission. The vital signs, except for the pulse rate, returned to normal in twelve hours, and the blood stream was sterile. Congestive heart failure, auricular fibrillation and delirium tremens developed. In spite of oxygen therapy and digitalization, the patient became comatose and died thirty-six hours after admission.

Autopsy showed lobar pneumonia, type II, in the lower lobe of the right lung, rheumatic heart disease with congestive failure, hemorrhagic gastritis, and sterile pleural effusion on the right. A postmortem culture of the blood was sterile.

This patient should have been digitalized on admission, before signs of heart failure had developed.

CASE 5.—A. H., a man aged 52, with chronic alcoholism, entered the hospital on the sixth day of type V pneumonia, which involved the lower lobes of both lungs. Repeated blood cultures were all sterile. On admission he presented toxicity, deep jaundice, distention and delirium. He was treated with 320 cc. of type V rabbit serum given at two hour intervals in five doses. He responded by crisis in twenty-four hours. Two days later, in spite of a high caloric diet, intravenous injection of dextrose and large doses of vitamin B₁, he had a recurrence of the delirium. The delirium failed to respond to the aforementioned measures plus oxygen inhalations and sedation, and the patient became comatose and died four days after admission. Autopsy revealed lobar pneumonia, type V, in the lower lobes of both lungs, early cirrhosis of the liver, toxic hepatitis, pericardial effusion, dilatation of the right side of the heart and cerebral edema.

Of all the complicating factors noted in this series, the most serious and difficult to treat was alcoholic delirium. In three of the five fatal cases death was mainly due to this factor.

SUMMARY AND CONCLUSIONS

One hundred patients with twenty-three proved types of pneumococcic pneumonia were treated with serum plus the usual supportive measures. There was a gross mortality rate of 5 per cent. Rabbit serum was preferred because it caused considerably less immediate reaction than horse serum. On the basis of comparison of statistics for this and previous years, both rabbit and horse serum are considered effective and valuable therapeutic agents.

As a result of this study plus experience gained with the use of sulfapyridine in cases of type III pneumonia and serum sensitive cases of other types, it is felt that the program and principles of treatment set forth in this paper should be continued during the coming year, but that certain modifications are needed. These modifications are related to the place of serum and sulfapyridine or their combination in the treatment of pneumonia. The tentative plan for the year 1939-1940 is as follows:

1. All patients with type III pneumonia are to be given sulfapyridine unless a contraindication exists. If these patients fail to respond in twenty-four hours, type III rabbit serum is to be administered in addition.

2. Patients with early stages of pneumonia due to pneumococci of types I, II, V, VII, VIII and XIV are to receive serum, preferably rabbit, when the etiologic diagnosis can be made without delay. Patients who fail to respond in twenty-four hours are to be given sulfapyridine.

3. Treatment of all patients with types of the pneumococcus higher than XIV is to be started with sulfapyridine, and serum is to be given in addition only when necessary.

4. Allergic and serum sensitive patients are to be given chemotherapy.

5. Postoperative patients for whom nausea and vomiting would be dangerous are to receive serum therapy.

6. Patients with multiple types of pneumococci are to be given sulfapyridine first and serum later if necessary, except when one of the organisms is of type I or II.

7. Severely ill patients for whom the outlook is obviously poor are to receive sulfapyridine for the first twelve hours and then specific serum.

It is felt that these modifications should reduce further the mortality rate from pneumococcic pneumonia.

THE USE OF THE URINE IN THE CHEMICAL TEST FOR INTOXICATION

POSSIBLE ERRORS AND THEIR AVOIDANCE

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Determination of the amount of alcohol in the blood has now become an important feature in the medicolegal diagnosis of intoxication. It is usually impossible, however, to obtain blood for direct analysis; if it is obtained, the findings may be excluded as evidence in court.¹ Consequently an indirect determination of the concentration is now often made from saliva, from lung air and especially from urine.²

The use of the urine has some practical advantages. Under properly controlled conditions—but only under such conditions—the concentration of alcohol in the urine is an accurate index of the concentration of alcohol present in the blood at the time the urine is obtained. As the test is now often carried out by or for the police, serious discrepancies may occasionally occur, and the concentration of alcohol in the urine may differ widely from that in the blood. Consequently this testimony may jeopardize the individual who is suspected of being intoxicated and this useful test may be finally discredited.

The concentration of alcohol in the urine as secreted is known to correspond exactly to that simultaneously in the blood in the relation of the solubility of alcohol in the two fluids.³ But the concentration in the urine that has accumulated in the bladder may not show this correspondence. Except for short periods the concentration of alcohol in the blood is not constant but instead it rises or falls, depending on whether the rate of absorption of alcohol from the alimentary tract is greater or less than the rate of oxidation and elimination. The concentration of alcohol in the urine secreted varies correspondingly. Consequently the urine that collects in the bladder is a composite.

This fact has been recognized but the very considerable differences in the concentration of alcohol in urine and blood, which are shown here, have not previously been demonstrated. Attorneys have pointed out in court that the concentration of alcohol in bladder urine collected over an undetermined length of time might be higher than that in the blood at the time the test was made. Medical experts, while admitting this fact, have countered with the statement that the concentration in bladder urine represents an average which is therefore lower than the highest concentration reached in the blood.

If the only fact in question is whether or not the suspect has taken alcohol, the presence of alcohol in the urine gives a positive answer. But the present tendency is to judge the extent of intoxication from the

concentration of alcohol in the urine. It is here that an important distinction must be made. It is only the concentration of alcohol in the blood that is the significant value; the sole purpose of the test on the urine is to obtain this value. The concentration of alcohol in the blood, when determined directly on the blood or indirectly from the lung air, is the concentration which exists exactly at the time the test is made. But when the concentration in the blood is estimated indirectly from the urine the figure obtained may be that for a concentration which existed at some indeterminate time previously. It may be considerably higher than the concentration in the blood. The suspect may thus be penalized accordingly.

The suspect in whom a high concentration of alcohol is found in the urine, regardless of the length of time the urine has been retained, probably deserves conviction. But laboratory tests should not indicate mere probabilities. Precision is important in view of the standards embodied in the laws of some of our states⁴ and advocated by a committee of the American Medical Association⁵ and by the National Safety Council.² The essential features of the standard now most generally in favor are that a concentration of 0.05 per cent or below in the blood shall constitute conclusive evidence of sobriety; 0.15 per cent or above, evidence of intoxication, and values between these extremes probability of intoxication. The fact that there is a considerable range as between the concentration of 0.05 and 0.15 per cent does not lessen the need for precision, since a slight variation near either of these values may place the accused incorrectly in one or another of the categories arbitrarily defined. Moreover, the establishment of any quantitative value for the concentration of alcohol in the blood presupposes that it shall be the concentration at the time the test is made.

The data given in the accompanying table illustrate the influence of the frequency of voiding on the concentration of alcohol present in the urine as compared to that in the blood. Eleven male subjects ranging in age from 22 to 54 years and in weight from 122 to 187 pounds (55 to 85 Kg.) were given in each test 250 cc. of undiluted whisky. The concentration of alcohol in the blood was determined at one-half hour intervals directly from the capillary blood and indirectly from the lung air.² The concentration in the urine was determined at intervals ranging from thirty minutes to six hours; no urine was voided between these intervals. All the values given are averages for the eleven subjects; each column presents the results from a separate series of experiments. The concentrations of alcohol as obtained from the urine are converted to those of blood on the basis of a coefficient of 1:1.3.

During the rapid absorption of alcohol from the alimentary tract the concentration in the blood, as determined from the urine, is low; this is true even when, as here, the bladder is emptied of urine at the time the alcohol is ingested. Thus the urine voided at thirty minutes and one hour after the ingestion of the alcohol gave values (column 3 in the table) of 0.037 and 0.163 per cent; the concentrations in the blood (column 2) were 0.152 and 0.193 per cent. These differences can be explained from the facts that (1) the alcohol in the urine secreted during the first half hour is diluted with the urine retained in the pelvis of the kidney and (2) the rise in concentration of alcohol in the blood during

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2. Committee on Tests for Intoxication, National Safety Council Reports, 1938 and 1939, Chicago.

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4. Report of Committee to Study Problems of Motor Vehicle Accidents, J. A. M. A. 112: 2164 (May 27) 1939.

5. Haggard, H. W.; Greenberg, L. A.; Miller, D. P., and Carroll, R. P.: *The Alcohol of the Lung Air as an Index of Alcohol in the Blood*, J. Lab. & Clin. Med., to be published.

the first half hour after ingestion is rapid. It rises from zero to nearly the maximum concentration attained; the composite concentration in the urine thus falls between extreme values and may therefore be considerably lower than the higher of these values.

After the initial rise during active absorption of alcohol, the concentration in the blood falls only as alcohol is oxidized and eliminated. This fall is slow. For the amount of alcohol given here, ten hours elapsed between the maximum concentration of alcohol in the blood, 0.193 per cent, and the disappearance of the alcohol. The average fall in the concentration as measured was therefore 0.0096 per cent for half an hour; the extremes found were 0.002 and 0.019 per cent. Over any short period of time, such as one-half hour, the concentration of alcohol in the urine collected in the bladder lies between very narrow extremes.

The close correlation of the concentration in the blood as measured directly and as obtained from the urine at half hour intervals is shown in columns 2 and 3 of the table. Between one and one-half and ten hours after the consumption of the alcohol the concentrations obtained at half hour intervals on the blood gave an average value of 0.103 per cent and from the urine 0.108 per cent; the maximum deviation at any single measurement was 0.009 per cent.

When the time over which the urine is collected is increased, the correlation becomes progressively less precise. Thus when the urine was collected for intervals of one hour the average values were 0.087 and 0.098 per cent and the maximum deviation for any single measurement 0.019 per cent. When collected for two hour intervals the average values were 0.087 and 0.106 per cent and the maximum deviation 0.042 per cent. For four hour intervals the average values were 0.055 and 0.098 per cent and the maximum deviation 0.052 per cent. Thus when urine has collected for a period greater than one hour at the time the test is made an appreciable error may be introduced into the determination made from the urine.

When the urine is collected for long periods of time the error assumes such magnitude as to invalidate any quantitative conclusion. Thus when the subjects did not void for six hours after ingestion of alcohol, column 9, the concentration as estimated from the urine was 0.158 per cent but that determined on the blood was 0.078 per cent. When they voided at one hour and at eight hours, column 10, the concentrations at the latter time were respectively 0.150 and 0.037 per cent. It is important with regard to the procedure to be suggested here for obtaining accurate values from the urine that the samples of urine taken one-half hour after those which gave the values of 0.158 and 0.150 per cent, columns 9 and 10, were 0.069 and 0.034 per cent; the corresponding concentrations as found in the blood at this time were 0.066 and 0.030 per cent.

In addition to the experiments recorded in the table, one subject was given 250 cc. of whisky on going to bed at 10 p. m.; the urine was retained until 8 a. m. At this time the concentration in the blood, as judged from the urine, was 0.11 per cent. Direct determination on the blood showed no alcohol.

Urine does not ordinarily accumulate in the bladder for six hours or more as in some of these experiments. Other investigators⁶ have stated that the diuresis which may be caused by alcohol, or the bulk of fluid taken

with it, leads to frequent urination so that the extreme discrepancies between the concentrations in the blood and urine, such as those shown here, do not, as a rule, occur. No doubt such is generally true; under the conditions of ordinary medicolegal tests there is usually fair agreement between the concentrations of alcohol found in blood. But there are occasional exceptions, and it is with these that we deal particularly. We find that there are wide variations in the diuresis from alcohol; there is also wide variation in the volume of fluid taken with the alcohol. Two of the eleven subjects employed here showed no diuresis with the amount of alcohol given them. In the remaining nine, diuresis occurred. The diuresis started in the second half hour after the ingestion of the alcohol and persisted for one and one-half hours.

The average volume of urine secreted for the full eleven hours of the experiment was 930 cc.; the individual extremes were 484 and 1,298 cc. During the first two hours, the time of the diuresis, the average amount of urine secreted was 390 cc.; the individual

Concentrations of Alcohol in Blood and Urine

Time After Ingestion of Alcohol, Hours	Concentration of Alcohol in Blood, per Cent	Concentration of Alcohol in Blood as Estimated from Urine Voided at Times Indicated (Ratio of Solubility of Alcohol in Blood and Urine Taken as 1:1.3)									
½	0.152	0.037									
1	0.193	0.163	0.141								0.149
1½	0.191	0.192									
2	0.185	0.188	0.191	0.171		0.176					0.169
2½	0.171	0.177									
3	0.160	0.165	0.172								
3½	0.141	0.146									
4	0.129	0.133	0.143	0.171	0.166			0.169			
4½	0.115	0.111						0.116			
5	0.103	0.109	0.121								
5½	0.091	0.100									
6	0.078	0.082	0.095	0.106						0.158	
6½	0.066	0.070								0.069	
7	0.057	0.062	0.067								
7½	0.049	0.051									
8	0.037	0.043	0.049	0.057	0.089	0.106				0.150	0.121
8½	0.030	0.033								0.034	
9	0.023	0.026	0.032			0.031					
9½	0.016	0.021									
10	0.007	0.012	0.016	0.024				0.087			
10½	0.003	0.005						0.004	0.051		
11	0.000	0.003	0.006		0.039				0.002		

extremes were 91 and 612 cc. The subjects who had the greatest diuresis suffered considerable discomfort in retaining the urine during the first four or six hours, columns 8 and 9; those who had little or no diuresis had no desire to urinate. None of the subjects suffered discomfort when urine was voided at two hours and again at eight hours, column 11. The average volume collected at the latter time was 296 cc.; the individual extremes were 208 and 396 cc. The concentration of alcohol in the blood at this time was 0.037 per cent but, as estimated from the urine, 0.121 per cent.

The discrepancies which, as we have shown, may occur between the concentration of alcohol in the blood and in the urine can be avoided by making the test from the urine by the following procedure, which takes advantage of the close correlation of the concentration in blood and in urine taken at half hour intervals. The suspect is requested to empty his bladder; the specimen is discarded or, if the concentration of alcohol is determined, it is taken as having only qualitative significance or it is used in conjunction with the subsequent determination to judge whether the concentration in the blood is rising or falling. One-half hour later the individual is again requested to void. Even the small amount of urine collected is sufficient for the determination of the concentration of alcohol. The value obtained is

6. Bavis, D. F., and Arnholt, M. F.: The Specificity of Methods for Determining the Concentration of Ethyl Alcohol in Body Fluids with Specific Reference to the Heise Method, *Nebraska M. J.* 32: 407 (Nov.) 1938.

divided by 1.3 and the dividend is taken as the concentration of alcohol in the blood at the time the test is made.

The concentration thus found will lie between the concentrations in the blood at the beginning and at the end of the half hour period. If the concentration of alcohol in the blood is falling, the concentration as found from the urine will not be higher than that which existed in the blood at the time the suspect was taken into custody and requested to void. It will be lower than this value by less than the small amount that the concentration had fallen during the half hour period. If the concentration in the blood is still rising from the absorption of alcohol, the concentration as found from the urine will again fall between the two concentrations in the blood but will be higher than the first and lower than the second. Values obtained in this manner have definite quantitative significance which can be defended in court.

An occasional individual may be unable to void within a half hour. If necessary, a somewhat longer time may be given without altering the principle that the concentration as found is that which existed within the time between the two voidings. The probable extent of the error introduced can be judged from the values given in the table.

RELATION BETWEEN THE CONCENTRATION OF ALCOHOL IN BLOOD AND IN URINE

In the kidney, alcohol passes from the blood into the urine by diffusion;³ the amount of alcohol in the two fluids is determined by the respective solubilities of alcohol. For urine collected over short intervals the ratio of solubility (with blood taken as 1) has been determined by Southgate and Carter⁷ as 1.37, by Carlson, Kleitman, Muehlberger, McLean, Gulicksen and Carlson⁸ as 1.32, by Jetter⁹ as 1.23 and by Bavis¹⁰ as 1.22. In the present study we have obtained a value of 1.31 when urine was collected at half hour intervals. We have in addition determined *in vitro*⁵ this ratio for urine of different specific gravity; at 1.028 the ratio was 1.27, at 1.012 it was 1.30 and at 1.002 it was 1.34. The slight differences in solubility resulting from alteration in concentration of the urine, or as found by different investigators, are of little importance since the extremes do not vary more than 5 or 6 per cent from an average value of 1.30. These variations are well within the limits of accuracy of most of the clinical methods used for the analytic determination of alcohol in urine.

ABSORPTION OF ALCOHOL FROM THE BLADDER

The question of absorption of alcohol from the urine into the blood has been raised with regard to the use of the concentration in the urine as an index of that in the blood.¹¹ Völtz, Baudrexel and Dietrich¹² in 1912 showed that when alcohol is injected in considerable quantities into the bladder of a dog it disappears from the urine and appears in the blood. This work has been quoted as indicating that the rate of absorption is nearly

independent of the concentration.¹³ In reality Nicloux and Nowicka¹⁴ in 1913 demonstrated that it varies with the concentration. They found that, when the concentration in the urine was brought to 1.5 per cent, 25.8 per cent of the alcohol was lost in two hours and that, at 2.2 per cent, 43.6 per cent was lost in this time. The concentrations used by these investigators were far in excess of the differences in concentrations in blood and urine found in medicolegal tests. We do not doubt that alcohol may be absorbed from the bladder but, in the low concentrations appearing after alcohol is drunk, the absorption is insignificant.

The possibility of absorption was, however, tested experimentally on men by two procedures. Two of the subjects employed in the present study gave no diuresis from the amount of alcohol given. When they had taken no fluid after 10 o'clock at night, their hourly secretion of urine during the following morning was virtually uniform and was not affected by the drinking of 180 cc. of water containing 40 Gm. of alcohol. On alternate days, to a total of ten, the urine was voided at half hour intervals so that no appreciable difference in the concentrations of alcohol in the urine and in the blood could develop. On the remaining five days the urine was held in the bladder for eight hours to obtain a maximum difference between the concentrations in the urine and in the blood. For one subject the urinary output, when voided at half hour intervals, was 424 cc.; the concentration of alcohol was 0.049 per cent. When the urine was collected for the entire period the volume was 437 cc. and the concentration 0.046 per cent. The corresponding values for the other subjects were 480 and 505 cc. and 0.054 and 0.051 per cent. The close correspondence of the concentrations under the two conditions would indicate that at least after moderate amounts of alcohol there is no appreciable absorption from the bladder.

In the second series of experiments, no alcohol was taken by mouth. The blood and urine were tested to prove the absence of alcohol. Urine was allowed to collect in the bladder for three or four hours; a catheter was then inserted and held in place. Under sterile conditions the urine was withdrawn and measured. Sufficient alcohol was added to give a concentration between 0.22 to 0.41 per cent and a sample was analyzed to determine the exact concentration. The amount of alcohol in the bladder was calculated from the volume and percentage. The urine was then run back into the bladder and allowed to remain there for two hours. The bladder was then emptied and washed twice with 60 cc. of water; the total volume of the fluid obtained was measured and the concentration of alcohol determined. The amount of alcohol recovered was calculated from these values. For one subject 492 mg. of alcohol was introduced into the bladder; 466 mg. was recovered two hours later; the loss was 5 per cent. For the second subject 223 mg. was introduced and 207 mg. was received two hours later; the loss was 7 per cent. In these experiments all error is in the direction of failure to recover alcohol, since appreciable amounts may remain in the film of moisture left on the surface of graduates, catheter and bladder wall. The slight losses of alcohol found here indicate that, at concentrations in the urine found on medicolegal examination, absorption is of no practical significance.

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CONCLUSIONS

In the medicolegal diagnosis of intoxication the concentration of alcohol in the blood is frequently estimated indirectly from that found in the urine.

Unless special precautions are taken, serious errors may occasionally occur.

The ratio of the concentration of alcohol in blood to that of urine varies only slightly with the specific gravity of the urine; the ratio as determined here is 1:1.3.

Absorption of alcohol from the bladder into the blood does not occur to a significant extent at the concentration found in the urine after drinking alcohol.

THE TREATMENT OF FRACTURE OF
THE EXTERNAL TIBIAL CONDYLE

(BUMPER FRACTURE)

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There is, even in recent literature, a wide diversity of opinion as to the best method of treatment of fracture of the upper end of the tibia. The problem can be simplified somewhat, I believe, if one fairly large group of cases is segregated and the treatment outlined in some detail. No attempt will be made to cover the whole field of fractures of the upper end of the tibia.

Of seventy-five consecutive cases of fracture of the upper end of the tibia admitted to the Massachusetts General Hospital Fracture Clinic, thirty (40 per cent) were fractures of the outer condyle without associated fracture of the fibula. This represents the largest single type of fracture in this region. It has been recognized as an extremely serious fracture by practically all observers, not because of nonunion, which rarely, if ever, occurs, but because it involves a weight bearing joint, and loss of normal knee joint function is the inherent danger.

TYPE OF INJURY

Three types of injury account for these fractures: (1) a direct blow on the outer aspect of the knee, (2) a fall from a height or (3) a twisting injury (tables 1 and 2). As the automobile bumper accounted for only 47 per cent of these cases, bumper fracture is not a particularly good name for it. The twisting injuries were all very similar, i. e. the victim's foot while walking or running caught in a hole, and the sudden twisting violent blow transmitted to the knee caused the injury.

PATHOLOGY

Understanding of the normal and pathologic anatomy is a prerequisite to correct treatment. The stability of the knee joint is not due to the depth and contour of the joint surfaces as is the hip but to the extremely strong supporting ligaments and surrounding musculature. The internal and external lateral ligaments in particular are extremely resistant structures. The normal inward inclination of the femoral shaft causes more stress to be placed on the outer than the inner femoral and tibial condyles.

If a person is attempting to elude an oncoming automobile but is not quick enough to escape, his leg will often be struck on its outer aspect at or just below the

knee joint. The victim's foot fixed on the ground and the inertia of the body weight prevent displacement of the leg. There is, therefore, a force which, acting on the outer border of the knee, tends to produce a knock-knee deformity (*genu valgus*). The extremely strong internal lateral ligament and the inner muscular structures resist the tendency for the inner femoral and tibial condyles to separate. The outer femoral condyle, which transmits most of the body weight to the tibia, is therefore driven down into the central portion of the outer tibial condyle. The central portion of the articular cortex of the outer tibial condyle is usually comminuted and depressed below its normal level into the cancellous portion of the bone, and in addition there is a bursting outward of the outer margin of the articular cortex of the tibia with an associated longitudinal fracture running downward toward the shaft of the tibia (fig. 1). This outer fragment is almost always of fairly good size and is roughly triangular with the base of the triangle upward. It is to be particularly noted that this fragment does not displace downward, as it is held in place by the intact fibula, which acts as a buttress, and by the strong capsular ligaments attached to the margins of the joint. The external semilunar cartilage is usually torn sufficiently from its normal attachments to allow it to displace downward somewhat into the central cavity. Even in unreduced cases, however, it rarely, if ever, produces symptoms due to locking.

TABLE 1.—Type of Injury

	Cases	Per Cent
1. Direct blow on the outer aspect of the knee		
(a) Automobile bumper	14	47
(b) Other	5	17
2. Fall from a height.....	1	13
3. Twisting injury	10	33
Total.....	30	100

TABLE 2.—Age and Sex

Age			Sex	
Youngest	Oldest	Average	Male	Female
28	79	51	13	17

TREATMENT

The degree of displacement of the fractured fragments is the key to rational treatment.

A. *Minimal Displacement.*—In these cases (fifteen, or 50 per cent, of our series) there is by x-ray examination less than one-fourth inch displacement of the fragments, and an excellent anatomic result can be anticipated if the fracture is protected until consolidation is complete. The details of treatment can be varied within wide limits without jeopardizing the result. My method is immobilization in a carefully molded plaster cast or splint or in a Thomas splint with a Pierson attachment and with the knee in slight flexion until the swelling of the joint has subsided. This usually requires from one to two weeks. Aspiration of the joint effusion during the acute phase is permissible but is not necessary. Daily physical therapy is then instituted. At first this consists in baking, massage and quadriceps setting exercises. Gentle active motion of the knee always within the limits of discomfort is added to this program within another week or two. This is continued until normal musculature and a range of motion well beyond right angle flexion is obtained. The patient may be up on crutches after the first week or

two, but no weight bearing is permitted for a minimum of ten weeks after injury. A few intelligent and cooperative patients are allowed to begin guarded weight bearing with crutches and an elastic bandage applied to the knee, but the majority are fitted to a long caliper brace with a knock-knee strap which passes around the

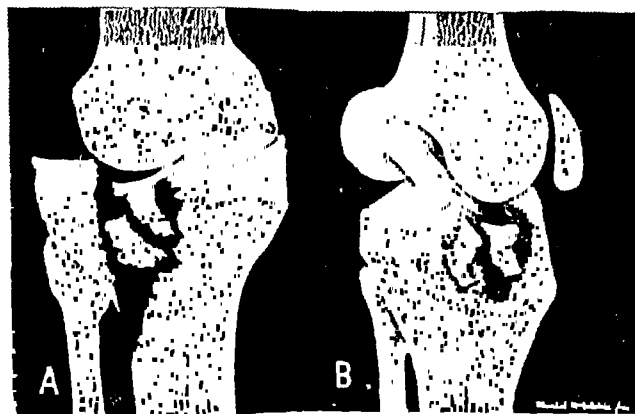


Fig. 1.—Sagittal (A) and coronal (B) sections through the knee to show the usual type displacement of the fracture.

outer upright and pulls the knee toward it, preventing any tendency to occurrence of knock-knee deformity (fig. 2). The brace is worn for from two to six months and then discarded. If there is a tendency to pronation of the foot, a Thomas heel is used. The results of this type of treatment have been uniformly satisfactory in my experience.

B. Slight to Moderate Displacement.—Seven (23 per cent) of the cases were classified in this group, the displacement of the fractured fragments amounting to between one-fourth and one-half inch, and it is here that variance of opinion as to proper treatment is found. Three of these cases in the series were treated conservatively. One had a closed manipulation and three were subjected to open reduction. So far as I can ascertain from this small series of cases, the one year end results were about equally satisfactory. Whether a longer follow-up will reveal the development of instability, pain, hypertrophic degenerative joint changes and so on in more cases treated conservatively than operatively or vice versa remains to be seen.

C. Moderate and Marked Displacement.—Eight (27 per cent) of the cases in this series had displacement of fragments amounting to one-half inch or more, as estimated from x-ray appearance. It is my opinion that open reduction and fixation is the only satisfactory method of treatment in this group of cases. If unrecognized or deliberately left unreduced, the result is a painful, weak, unstable knee, which shows on examination marked abnormal lateral mobility. Increasing knock-knee deformity and marked hypertrophic changes occur as time elapses.

Manipulation cannot possibly effect anatomic reposition of the joint surface of the tibia. The comminuted depressed fragments in the central part of the tibial table are free fragments, have no ligamentous or muscular attachments, and lie in their depressed position surrounded by bone. So far as these fragments are concerned, manipulation is completely ineffectual. The outer larger laterally displaced fragment is not displaced downward and so does not need elevation. The use of a nutcracker vise or a carpenter's screw clamp has been recommended. They may effect reduction of the lateral

displacement, but the central fragments are thereby impacted in their displaced position and the articular surface of the tibia remains distorted. Satisfactory anatomic reduction cannot be anticipated by this maneuver. It is axiomatic that fractures involving weight bearing joints require as nearly anatomic reduction as possible if good function is to be obtained.

A satisfactory method of open reduction must include (a) direct inspection of the joint surface so that the accuracy of the alignment of the articular cartilage may be verified, (b) an approach to the centrally displaced fragments from below so that they can be individually manipulated into place, (c) replacement of the laterally displaced outer fragment and (d) fixation of the fractured fragments so that early motion may be started and stiffness and atrophy avoided.

The technic to be described fulfils these requirements. It is not a new operation in the strict sense of the word, but it combines certain features of several previously described operations and is accepted by the members of our fracture clinic as the most satisfactory solution of the problem so far available.

TECHNIC

The operation is always performed under a tourniquet, as a bloodless field is essential. The skin incision begins about 1 inch lateral to the superior pole of the patella and extends downward just lateral to the tibial tubercle, then curving outward to end about 4 inches below the joint line just anterior to the fibula (fig. 3). The skin and subcutaneous tissues are reflected laterally off the muscles underlying the lower part of the incision until the head of the fibula comes into view. Attention is then turned to the joint, which is thoroughly inspected through a longitudinal incision in the capsule just lateral

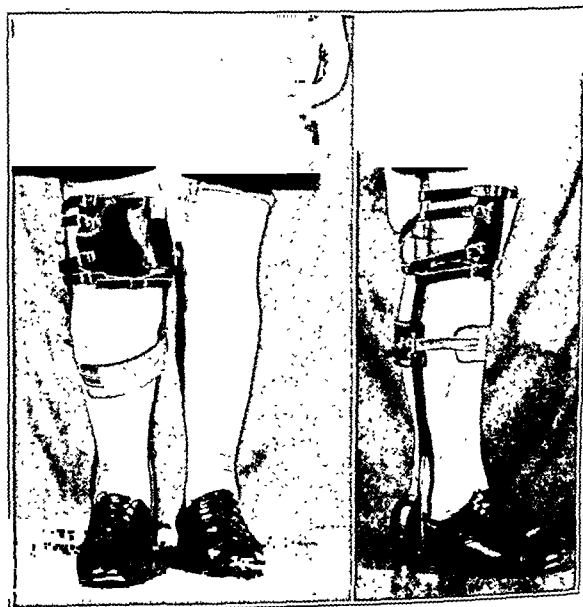


Fig. 2.—The brace has a knock-knee strap which prevents recurrence of the original deformity during the early stages of weight bearing.

to the patella. In order to visualize the extent of the fracture, it is usually necessary to remove the external semilunar cartilage, after which the whole articular surface of the outer condyle of the tibia is easily inspected.

Next the longitudinal fracture line is exposed by subperiosteal stripping (fig. 4) of the common origin of the extensor muscles from the anterolateral surface

of the outer tibial condyle. The incision is \neg shaped. The horizontal limb is from one-half to 1 inch long. Beginning at the tibial tubercle, it extends laterally parallel to and just below the anterior margin of the joint. The vertical limb extends downward for 2 or 3 inches from the tibial tubercle, just lateral to the crest

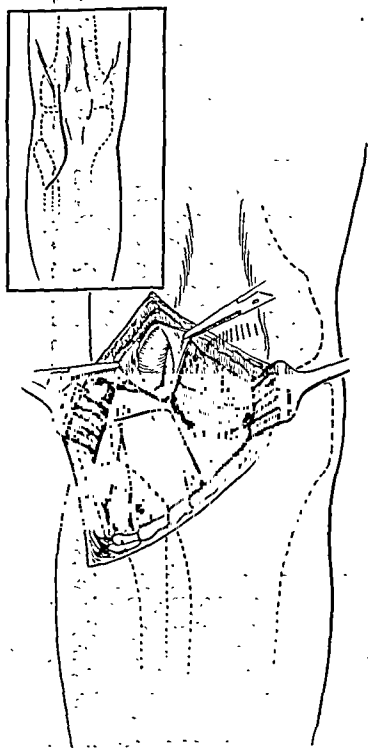


Fig. 3.—Operative approach. The knee joint has been opened for inspection, and the incision for the reflection of the muscles from the tibial condyle has been outlined.

of the tibia. The incision is carried through the periosteum and the muscles are reflected with the periosteal elevator laterally until the vertical fracture line is exposed. Care should be taken to leave the muscles attached to the lateral fragment, which is retracted laterally, opening the fracture line and giving access to the central part of the tibial condyle. The depressed fragments of articular cortex with cartilage attached can then be carefully replaced, by means of a blunt dissector or bone grasping forceps. In some instances, additional bone chips removed from the tibial shaft may be packed beneath the replaced fragments. The articular cartilage of the tibial condyle should present after this step a smooth anatomic restoration of normal contour. The operation must be considered a failure unless this is obtained. One then replaces the lateral fragment snugly, being sure that it locks the other fragments in jig-saw puzzle fashion. It can easily be demonstrated at operation that the replaced fragments tend to slip unless the large lateral fragment is firmly immobilized. Many methods have been tried, beef bone and ivory pegs, wood screws, autogenous bone grafts. None have proved as satisfactory as anchorage to the intact cortex of the medial tibial condyle by "bolting." This is mechanically secure; the compressive "bottling" effect of the bolt effectually prevents displacement and allows early motion to be begun. A Sherman screw, preferably of vitallium or stainless steel, with a washer over the head and a nut on the free end is used. It is sufficiently strong, and there is little or no tissue reaction about it. To introduce this bolt, a long drill of suitable size (No. 32) is inserted through the superficial lateral aspect of the lateral fragment and is directed slightly posteriorly and medially parallel to the joint surface to emerge through the medial tibial cortex just posterior to its subcutaneous surface. The drill point, felt through the skin, is brought out through a small skin incision. While the fragments are carefully held in place, the drill is removed and the Sherman screw with a washer over its head is inserted and tightened down snugly

with the screw driver. A long enough screw is used (from 3 to 4 inches) so that the end projects well beyond the cortex on the medial side. The nut is then applied and tightened, so that there is no possibility of the screw loosening and losing its effective grip. The excess length of the screw is cut off with a heavy double action bolt cutter. With the knee joint under direct inspection, the knee is flexed to a right angle to check on the alignment and immobilization of the fragments. Unless there has been a technical error the knee is stable, there is no lateral mobility and the aim of the operation, anatomic restoration of the joint, has been accomplished. The wound is closed carefully in layers without drainage. The tourniquet is removed and a molded plaster splint and pressure dressing or a circular plaster in slight bow-leg position is applied (fig. 5).

POSTOPERATIVE CARE

After the stitches are removed and the postoperative reaction has subsided, the same program is carried out as was outlined for fractures with minimal displacement. Early motion is a feature of this schedule, and by the time weight bearing is permitted (from ten to twelve weeks after operation) there is usually an excellent range of motion present. Within six to twelve months after operation there should be a range of motion from full extension to right-angle flexion. The knee should be stable and an essentially painless normal gait should be present. It may not be necessary to remove the screw unless it shows signs of bone absorption or irritation around it, but it has been my practice to remove all "hardware" about one year after its introduction.

RECONSTRUCTION OF THE MALUNITED TIBIAL CONDYLE

Although the restoration of a condyle which has united in a deformed position is more of an orthopedic than a fracture problem, a word on it may not be amiss. In one case I have secured an excellent result by the following procedure: The operative exposure was identical with that used for fresh fractures, the joint being

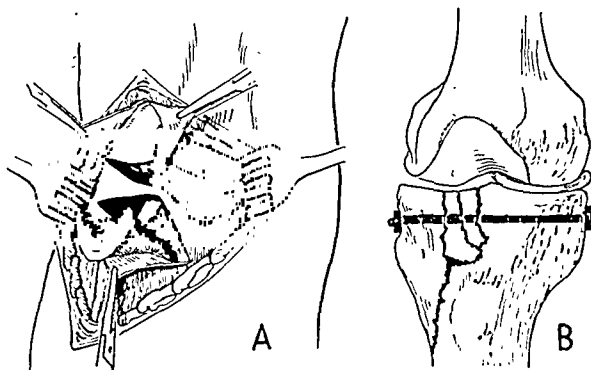


Fig. 4.—A, lateral bony fragment still attached to the muscles and the loose small fragments in the center of the condyle. B, screw in place.

opened through a longitudinal incision and the outer condyle exposed by stripping the muscles from it subperiosteally. A window of cortical bone was then removed from the anterior aspect of the lateral condyle of the tibia just below the joint line. A small thin osteotome inserted through this window was used to make multiple stellate fracture lines in the displaced articular cortex of the tibia, care being taken not to injure the articular cartilage. It was then possible to

force the joint cartilage and articular cortex upward into normal position by means of slow molding pressure with a blunt instrument. The bony cavity below was packed with bone chips. Although the widening of the tibial condyle is unchanged by this procedure, the central part of the tibial table is restored to normal level.

END RESULTS

It is pertinent to point out that various members of the fracture clinic have cared for these patients and that treatment in certain instances has varied from the theoretical "ideal" program that has been outlined. It is against the background of constantly increasing clinical experience that the present ideas of treatment have been formulated.

The results in group 1 (minimal displacement) have been uniformly good, no matter what treatment was adopted.

In group 2 (moderate displacement) satisfactory functional results were obtained in the three operative cases and in the four cases treated conservatively, but examination of the end result x-ray films reveals, of course, in the latter group the same degree of displace-

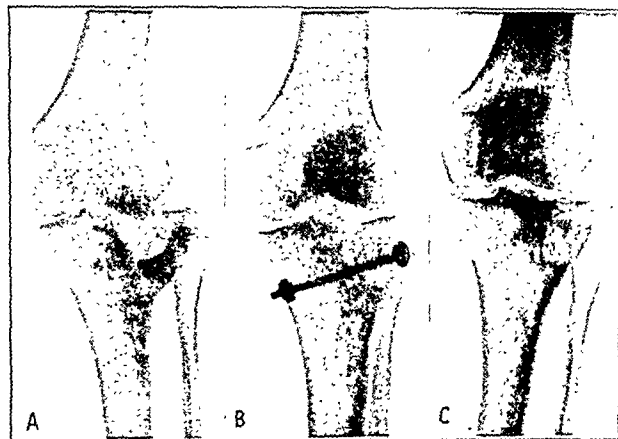


Fig. 5.—A, preoperative fracture. Note the two fragments displaced downward as well as the laterally displaced one. B, after operation. C, end results. The knee is stable and painless and has a full range of motion.

ment present originally. A follow-up of at least five to ten years will be necessary to determine whether conservative or operative treatment offers the best solution to these borderline cases.

In group 3 there were five cases treated by the operative technic described. These plus 3 cases from group 2 make too small a number for statistical verification of the adequacy of the operation. However, seven of the eight cases showed an excellent anatomic restoration, and the functional results were equally good. The period of disability averaged eight months. In the remaining case there was only a fair anatomic and functional result, apparently because of faulty operative technic.

SUMMARY AND CONCLUSIONS

Fracture of the outer tibial condyle without associated fracture of the fibula accounted for 40 per cent of all fractures of the upper tibia in this series and is the most common single type encountered. For purposes of treatment it is convenient to classify them with regard to the amount of displacement, i. e. slight, moderate or marked displacement of the fractured fragments. This fracture assumes a fairly constant form in which there is comminuted depression of the central

portion of the articular surface of the lateral condyle, and a large marginal fragment is displaced laterally. Manipulation is futile. The severely displaced fracture should be treated by open reduction and fixation, and an operative technic has been developed which has proved satisfactory in my hands. Although it is technically rather difficult and should be undertaken only by those experienced in surgery of the knee joint, it seems to afford the best anatomic and functional result. The after-care of the operative case and of the conservatively treated mild fracture is identical.

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ABSTRACT OF DISCUSSION

DR. CARL E. BADGLEY, Ann Arbor, Mich.: Dr. Barr has emphasized the need of a classification of the types of fracture that occur to the tibial plateau and that they should be analyzed and treated according to the displacement and to the indications. The type of fracture he is speaking about is one that is seen the most frequently. There are other fractures of the tibial plateau which he has not discussed. This fracture will occur to the knees in various positions of flexion and a greater amount of posterior displacement will frequently occur without the lateral displacement of the lateral tibial plateau. There is a great downward displacement of the posterior half or two thirds of the tibial plateau in some instances, which also requires the operative form of treatment. I have found in cases in which there was considerable displacement of the tibial plateau with associated injuries which were sufficiently severe that operation could not be done and that the use of Russell traction, which is in accord with Dr. Barr's method of support, has given excellent results without operative treatment. I feel, however, that with displacement of the joint fragments and the possibilities of injury to the meniscus and of nonunion of the fracture there is a group in which operation is indicated. I do not feel that Dr. Barr has completed the classification for the treatment of tibial plateau, but he has given us a good start so that ultimately we shall have more or less definitely outlined in mind the type of cases that can be treated by conservative methods.

DR. EARL D. McBRIDE, Oklahoma City: I agree with Dr. Barr that the two major objectives in treatment are (1) to restore the knee joint architecture and (2) to reduce and maintain replacement of fragments. In my experience the x-ray examination does not disclose the full extent of the pathologic condition in most cases. I have found the cartilaginous surface of rather large fragments turned completely upside down, yet the x-ray examination showed very little displacement or fragmentation. This is due, of course, to the lack of density of bone in this region. The operation which the author describes for open reduction is a procedure of choice. He is cautious about recommending open operations except in the third class of cases with marked displacement. I so often find more pathologic change than was expected that I would recommend exploration, at least in many of the cases of apparently mild displacement. On the other hand, I have been surprised at the good functional result in several cases in which the reduction was very unsatisfactory from the x-ray standpoint. My experience is similar to that of Dr. Barr in that the shorter screws and nails are unsatisfactory. If long screws are used and placed in a converging manner, contrary to the tension of displacement, they often hold satisfactorily. In several cases I have treated this type of injury by fixed traction, placing the patient on a Hawley table with a wire above and below the region of fracture and forcing the leg in the direction of correction of the deformity and putting it up in fixed plaster in that position. I have used magnesium pegs in two or three of these cases when there was a rather small fragment with moderate displacement but when I wanted it to hold. A small peg placed in there will hold and gradually absorb. A bone peg from the area below on the tibia may be used. That forms a nice method, but unfortunately one has to make a larger incision, with more trauma about the region of the fracture, which I do not like.

DR. JOSEPH S. BARR, Boston: My point in presenting this paper was to isolate a certain type of fracture of the upper end of the tibia and to discuss the treatment of that particular group of fractures and no other. Fractures of both tibial condyles, comminuted fractures and fractures involving the fibula with downward displacement do not fall into the group that is being discussed. For that reason I still feel that I can safely say that traction and manipulation have no place in the treatment of this particular group of fractures, that the displaced outer condyle cannot be changed in position by either manipulation or traction, that if one is going to do anything at all for it one must do it by open reduction. In those fractures with minimal displacement, the external semilunar cartilage remaining in place has the effect of being a buffer between the mildly displaced fragments and the femoral condyle, and a smooth articular surface will reform if early motion is started and the surfaces are protected until union has occurred. In cases of moderate displacement there is certainly room for argument. I think perhaps one might be a little more radical and explore those with moderate displacement, but the immediate results are apparently about as satisfactory with conservative as with open operation. In the third group with marked displacement I think there can be no room for argument that the fragments must be reduced. The question is how they shall be held in place. I have tried various methods and have failed in maintaining reduction with all methods, with the exception of this one, which fixes the fragments firmly by securely holding the displaced fragments to the intact medial cortex. This is not an operation to be undertaken lightly. It requires major surgery to the knee joint and must be done by those experienced in knee joint surgery. If the operation is undertaken and one fails to secure a smooth anatomic reposition of the fragments, one has failed in the operation and the patient is worse off than he was at the start.

ANOXIA

THE ANESTHETIST'S POINT OF VIEW

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MADISON, WIS.

Need for the present day reviving interest in nosology is illustrated by the terminology used in this symposium. By derivation, the meaning of anoxia is "without oxygen," a condition incompatible with life and therefore scarcely a suitable word to use in clinical discussions. For want of such a word as "hypo-oxia" or "hypoxia," anesthetists are in the habit of using the clumsy expressions "oxygen want," "oxygen lack" and "oxygen deficit."

Illness, injury and the exigencies of surgery cause pain and often an associated oxygen want. Pain relieving drugs have side effects which interfere with the mechanism of respiration. Hence if suffering is to be safely abolished or even minimized, the prevention and treatment of oxygen want must go hand in hand with drug administration. The delivery of oxygen from the respired atmosphere to cells of the central nervous system may be thought of as a transport mechanism. A simple diagram is frequently used in teaching the dangers of faulty oxygen transport and means of avoiding them. The student is advised to transpose his diagnosis of the condition of the patient before, during and after anesthesia into concepts applicable to such a diagram. In a consideration of the mother and fetus in utero, the diagrammatic concept is extended to include the

mother's pelvic blood supply, the placenta, the umbilical cord and the circulatory system of the fetus. Into such a concept it is easy to interpolate diagnostic observations and the indicated therapeutic procedures.

The circumstances which embarrass oxygen transport with which anesthesiology is concerned may be classified in four groups:

- (a) The condition of the patient before anesthesia.
- (b) The pharmacologic characteristics of drugs other than pain relief.
- (c) Disturbances of physiology due to technical difficulties of drug administration.
- (d) The contributions of surgery.

THE CONDITION OF THE PATIENT

Because of his illness or injury, the oxygen transport mechanism of the surgical patient is frequently defective. Consciously or unconsciously, the anesthetist must evaluate every patient's physical status in terms of ability to deliver oxygen to the central nervous system. The normal patient tolerates temporary oxygen deficit surprisingly well. Preexisting defect in transport reduces tolerance in geometric proportion to the gravity of the defect. The history and the physical and laboratory examinations are searched for indications of defective oxygen delivery. Is there evidence of hypersensitive autonomic reflexes or attacks of syncope? Has there been bleeding? What is the quantity of hemoglobin, the number of red blood cells, the functional capacity of the heart, the pulse pressure, the condition of the arteries? Is the spleen normal? Is there evidence of or a history of pneumonia, pulmonary tuberculosis or fibrosis? So important does the anesthetist consider patency of the air passages that he rarely trusts the preoperative examination of the upper respiratory tract to another. A preanesthetic record of temperature, pulse and respiratory rate and blood pressure is important as a control with which to compare observations made during and after anesthesia. Administration of anesthetics for so-called emergency operations to patients without preliminary examination has led to frequent morbidity and mortality due to oxygen lack which, if anticipated, might have been prevented. Insistence on preoperative hospitalization for from twenty-four to forty-eight hours has saved many lives.

PHARMACOLOGY

Sedatives and narcotics administered orally or hypodermically as well as anesthetic agents which are injected or inhaled for the prevention or relief of pain have similar effects on the mechanism of respiration. Almost without exception they depress the respiratory center, decreasing minute-volume exchange, the extent varying with the dose of the drug and the susceptibility of the patient. Obstruction to ventilation likewise is an indirect result of many pharmacologic effects. Secretions of the mucosa and salivary glands are either increased or decreased and made more viscid. The pharyngeal, laryngeal and vomiting reflexes may be made hyperactive or obtunded and their normal coordination distorted. The cough reflex and ciliary activity may be paralyzed, thus depriving the respiratory tract of its normal janitor service. The muscle relaxation, so beneficent for the patient's comfort as well as the surgeon's convenience, may if neglected result in disaster. A relaxed tongue, obstructing the glottis, has not infrequently initiated a fatal anoxia.

From the Department of Anesthesia, University of Wisconsin Medical School.

* Read before the Section on Pathology and Physiology at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

TECHNICAL CONSIDERATIONS

Second to second supervision of the physiologic processes of anesthetized patients is essential for safety. Far more important is it than the choice of drug or even the dosage. The management of patients requiring pain relief after operation or in the medical wards is no less important although somewhat less exacting. A schedule of dosage and time of administration of morphine sulfate for postoperative pain relief is a disgrace to the hospital in which it is written. Individualization in the choice of agents and the doses in which they are given from minute to minute or from hour to hour, as the case may be, will minimize interference with oxygen transport.

When occasion demands, proper atmospheric mixtures must be offered the patient to insure sufficient tension of oxygen in contact with the alveolocapillary membrane. Artificial airways must be available and utilized promptly and with skill. The respiratory cen-

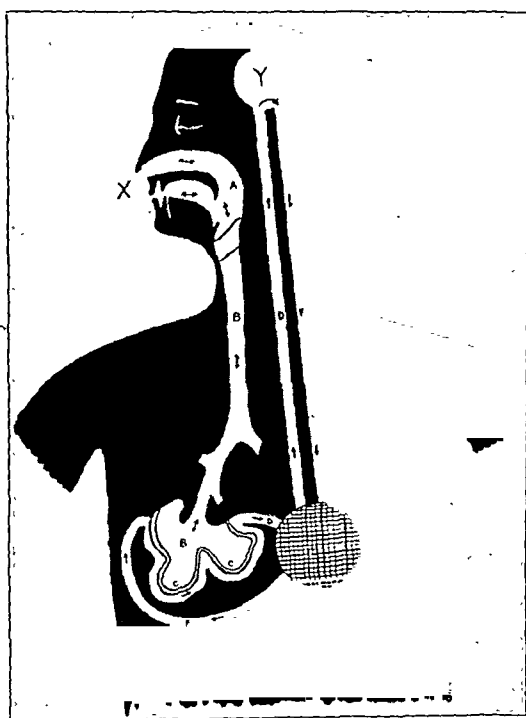


Diagram for teaching dangers of faulty oxygen transport and means of avoiding them.

ter subject to severe oxygen lack is not susceptible of stimulation until the defect is remedied. The availability of cylinders of compressed oxygen as a part of every anesthetic apparatus and as therapeutic equipment in every ward has benefited many patients and is saving lives daily.

Like all good things, however, oxygen is capable of doing harm. Extremely high tensions of oxygen help to maintain saturation of the hemoglobin (a pink patient) in spite of obstructed or depressed respiration. Diagnosis may thus be neglected and appropriate treatment delayed or omitted. Atmospheres containing largely oxygen, nitrous oxide or other rapidly absorbable gases are sometimes administered to patients when their breathing is temporarily stimulated (at the end of inhalation anesthesia or while subjected to carbon dioxide hyperpnea). If depressed breathing ensues immediately afterward, inactive or obstructed areas of lung may become rapidly atelectatic. It is thus obvious that, if oxygen deficit is to be avoided, even more

important than the proper choice of drug and the proper dosage of that drug is the constant intelligent supervision of the physiologic processes of the patient throughout the period of drug effect.

CONTRIBUTIONS OF SURGERY

The oxygen transport deficits attributable to surgery are considered by many to be secondary to blood loss and traumatic shock. The anesthetist, however, believes that the perfection of modern surgical technic minimizes these factors. Instead, it is apparent that anatomic distortions necessary for the performance of certain operations or the dressings essential following them are more frequently the causes of inadequate transport. The extreme Trendelenburg position, the "gallbladder lift," or the lateral position may initiate poor exchange, pulmonary atelectasis or even circulatory embarrassment. Plaster casts and tight binders necessary to protect areas recently operated on may add to the inadequate tidal exchange of patients treated for postoperative pain.

Evidence does not support the conclusion that either anesthetic agents or surgical trauma frequently produce a direct effect on the heart. Unrecognized and untreated defective oxygen transport may result in fatigue of both the myocardium and the respiratory musculature. Indirect effects operating through a hypersensitive autonomic nervous system admittedly do, on occasion, cause circulatory depression or even asystole.

COMMENT

The induction of anesthesia, whether by injection or by inhalation, stimulates the experienced anesthetist to watch carefully for the slightest evidence of oxygen lack. Hyperventilation is not considered a reliable sign of oxygen deficiency and in the presence of nonvolatile premedication and of profound dosage of anesthetic agents it seldom occurs. The absence of cyanosis likewise is not assurance of ample oxygen supply. If either hyperpnea or cyanosis is present, the cause must be sought and removed if possible. The following incomplete list of symptoms and signs has been found useful to the anesthetist in determining the possible presence of oxygen transport deficiency:

In the operating room:

Vomiting.

Dilatation of pupils.

Muscle twitchings and contractions.

Circulatory abnormalities: Disturbed pulse rate or rhythm; increasing or decreasing pulse pressure; skin pale, cold and wet, or blue; delayed capillary refilling.

Respiratory abnormalities: Phonation, obstruction, depression, altered rate and rhythm; asymmetrical chest movements; prolonged expiration; hyperpnea rarely.

In the ward:

Psychic changes: Anxiety; restlessness; fear of death; incoordination; uncooperativeness; delirium; unconsciousness.

Headache.

Nausea.

Air hunger.

Increasing temperature.

Circulatory abnormalities: Precordial or substernal pain; increasing pulse rate; syncope; shock.

Respiratory: Increasing rate; periodicity; obstruction; depression; asymmetrical chest movements; mediastinal shift.

When one or more of these signs and symptoms is noted during anesthesia, the addition of oxygen to the respired atmosphere is logical, since a preexistent

abnormally low tension may readily be the cause of the difficulty. As artificial atmospheres are so commonly used, a diagnostic test may conveniently be applied. An addition of oxygen to the inspired atmosphere should first be made as one or two inspirations of pure oxygen. If a short period of apnea follows, it is almost positive evidence that marked oxygen want previously existed. Thus the diagnosis of the condition is confirmed, but not the cause, nor is a higher tension of oxygen in the respired atmosphere necessarily the proper remedy. If the oxygen want has developed because of some form of obstruction to the air passages, to atelectasis, to depression of exchange or to a defect in circulatory transport, only temporary advantage will be gained through oxygen administration unless the transport embarrassment is relieved. Whenever a deficient oxygen supply is suspected, every effort must be made to diagnose the cause accurately and remove it if possible, before dependence is placed solely on high oxygen tensions in the inspired atmosphere. Breathing excess oxygen may mask the transport defect. The result may be a pink patient, it is true, but often one whose circulatory and respiratory muscles are subjected to unnecessary strain and whose biochemical balance is seriously disturbed.

The practice of administering as a matter of routine an oxygen atmosphere rather than an atmosphere of nitrogen and only sufficient oxygen has undoubtedly resulted in frequent untreated physiologic disturbance and unrecognized obstruction and depression of breathing.

After anesthesia and operation, the necessity of treating pain carries with it the same dangers of interference with normal respiration as those accompanying anesthesia. Muscular relaxation, inspissated bronchial secretions, depressed ciliary activity and absent or obtunded cough reflex rob the patient of his natural defense against obstruction to the air passages. Decreased minute-volume exchange results. Here psychic disturbances (uncooperativeness, delirium) and rising temperature, and pulse and respiratory rate are the suggestive evidences of oxygen want until proved otherwise. With the pulse rate as a guide, the richest oxygen atmosphere available should be administered. When maximum reduction in pulse rate has been attained, the tension of oxygen in the inspired atmosphere should be decreased gradually until the minimum flow of oxygen is determined which will maintain a minimum pulse rate. Again one should beware of masking the diagnosis of the underlying cause. Proper treatment may be delayed through the thoughtless continuation of oxygen therapy without search for the defect in the transport mechanism.

CONCLUSIONS

It is important to realize that disturbance of oxygen supply to the central nervous system is one of the most common deleterious effects of anesthesia.

The anesthetist does well to look on the physiologic mechanisms involved in the delivery of oxygen to the tissues of the body as a simple transport system.

Depression of and obstruction to respiratory exchange are common sequelae of anesthesia and pain therapy. Intelligent management, for example the use of artificial airways and manual or mechanical increase of tidal exchange to prevent disturbance of oxygen transport and to restore normal transport when possible, is a necessary corollary to drug administration.

Forewarned is forearmed. The integrity of the patient's oxygen transport mechanism should be investigated before pain relieving drugs are administered.

Oxygen therapy (high oxygen tension in the inspired atmosphere) is only one way of treating oxygen want in the tissues. Accurate diagnosis will often point the way to restoration of normal transport of oxygen, thereby eliminating the necessity for oxygen therapy. Adequate oxygen tension should be administered to avoid an oxygen deficit, but one should not be lulled into inaction so that one neglects diagnosis and any treatment which may restore a normal transport mechanism for distribution of oxygen to the cells of the body.

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ABSTRACT OF DISCUSSION

DR. F. A. D. ALEXANDER, Albany, N. Y.: The two points I should like to make are, first, that the signs of anoxia in the dog cannot be assumed to be quantitatively similar to those in the human being and, second, that the signs of oxygen want produced acutely in the normal human being are different quantitatively if not qualitatively from those produced in the sick patient, in the asphyxiated human being or in the anesthetized human being. My associates and I have observed the signs of acute anoxia in more than 1,600 instances in our clinic during the course of nitrogen inhalation treatments for schizophrenia. The first evidence of anoxia is an increase in respiratory rate and volume occurring simultaneously with an increase in pulse rate. The respiratory stimulation increases progressively, as does the tachycardia. The systolic blood pressure rises gradually and varies considerably in different individuals. The diastolic blood pressure may rise, fall sharply or remain unchanged. Cyanosis is not a prominent feature if the patency of the airway is maintained. The neuromuscular changes are motor restlessness, clonic contractions beginning as twitchings about the face and spreading rapidly to the extremities, tonic-tetanic spasms, and finally opisthotonos or torsion-extensor spasms. Consciousness is usually lost at about the point at which the pulse rate has reached 120. At the height of the anoxia, when the patient is breathing almost 100 per cent nitrogen, the arterial blood oxygen content is usually less than 2 volumes per cent. Obviously such a degree of anoxia can be safely maintained for only a short period. Normal physiologic functions are restored rapidly when oxygen is administered to terminate the treatment. The most striking feature of these treatments was the absence of the so-called crisis with a peripheral circulatory collapse and bradycardia which occur in anesthetized patients or in animals or in patients subjected to more prolonged periods of subacute anoxia.

DR. R. D. McCLURE, Detroit: In the Henry Ford Hospital Dr. Hartman demonstrated clearly, in deaths from anoxia, the changes in the brain. In many years of surgery in New York, Baltimore and Detroit, I have seen deaths on the operating table which occurred during nitrous oxide anesthesia. Many such deaths in the literature have been attributed to apoplexy, as no autopsy was done. It is now known that these deaths in the majority of cases are due to anoxia and are preventable. Many cases of physical or mental impairment following anesthesia have been reported and many more have not been reported. Two patients whose histories were reported a year ago in the *Annals of Surgery* were left practically decerebrated. One of them died a year later and another one some months later. There is reason to believe that milder grades of anoxia occur occasionally during anesthesia plus preoperative sedation and result in permanent damages to the brain which are not detectable by ordinary methods of examination. A student at the University of Michigan was leading her class in that particular group. She came to Detroit and had an impacted molar extracted. She went alone to the dentist. When she reached home that afternoon her vision was blurred. She was later taken to an ophthalmologist and glasses were prescribed. In school her companions noticed no change in her, but the teachers

did. Her work began to fall off and before many months had passed this girl had failed completely in her school work. She returned home and returned to the same dentist with an impacted molar on the other side. He said "Don't let anybody give you gas again for you can't take it." She had become blue; artificial respiration had been given. It is this type of case that we are so conscious of now. When we were doing the arterial punctures with Dr. Hartman, the doctor's arrival with the syringe to take the blood from the patient's artery acted as a signal to the anesthetist to turn more oxygen into her mixture. This led to the development of the photoelectric cell oxyhemoglobinograph, which the anesthetists is unable to deceive.

DR. ERNST GELLHORN, Chicago: This paper prompts me to elaborate at least briefly something of my ideas concerning anoxia and asphyxia. All physicians know that when we clamp the trachea in an animal the blood pressure first rises and then falls and the animal fails. This classic physiologic experiment shows the pathologic effects of severe asphyxia. It is a different condition, however, when one studies anoxia with a very mild degree of carbon dioxide excess. When one studies changes in oxygen concentration in pneumonia one finds that in some cases the oxygen saturation is decreased and in later stages of the disease there is also an increased carbon dioxide tension. I am inclined to consider this condition an attempt of nature to rid itself of anoxia, because one does not have here an anoxia with acapnia but anoxia plus some moderate carbon dioxide excess which will potentially stimulate circulation, respiration and the whole autonomic nervous system and thereby attempt to restore normal conditions.

DR. NICHOLSON J. EASTMAN, Baltimore: Our procedure at the hospital in the treatment of asphyxia neonatorum is something as follows: In the first place, warmth. These babies are shocked. They are kept warm and put in an apparatus in which there is heat, a Kreiselman apparatus; the same effect can be brought about by hot water bottles and blankets. Second, posture, declination of the head at an angle of about 30 degrees to facilitate drainage of mucus and fluid from the trachea. Third, aspiration of mucus from the trachea and the posterior pharynx, in order to make certain of an open airway, because obviously artificial inflation is impossible unless there is a clear airway. Finally, the introduction of oxygen into the pulmonary alveoli, or at least into the smaller bronchioles by one of several methods. In hospital practice, as I have said, we use the Kreiselman machine, which we have employed for several years with complete satisfaction. If that is lacking, it is my opinion that if one is experienced and doesn't blow too hard, mouth to mouth inflation is a satisfactory substitute for some of the machines such as the Kreiselman apparatus.

DR. RALPH M. WATERS, Madison, Wis.: In talking about the signs and symptoms which have come to be associated with oxygen want, I tried to eliminate the ones that we feel clinically have anything to do with carbon dioxide. Every anesthetist recognizes that every anesthetic which he gives has the two associated possibilities of high carbon dioxide and low oxygen, and it is very difficult to separate them. I anesthetized a woman who, under the effect of two different agents, had a complete cardiac standstill, asystole, with finger pressure on both eyeballs. I purposely carried her through various planes of anesthesia to respiratory arrest with ether, and only then did this excessive reaction of the oculocardiac reflex disappear. With the other agents I did not carry her to respiratory arrest and the reflex hyperactivity persisted. She was tested later without any anesthetic agent or drug effect at all, in the ward, and she had perfectly normal oculocardiac and carotid sinus reflexes. We had a male patient who at ward examination had a hyperactive oculocardiac and carotid sinus reflex of an extreme sort in which we could get a record of complete heart standstill. That man was anesthetized later with ether anesthesia and had a perfectly normal reaction under anesthesia. He had morphine and scopolamine previously. I cite these two cases as the extremes of what we encounter clinically of drug effect on these autonomic mechanisms.

ABDOMINAL BLOCK WITH GENERAL ANESTHESIA, FOR UPPER ABDOMINAL SURGERY

RALPH M. TOVELL, M.D.

AND

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HARTFORD, CONN.

The choice of anesthetic agents and methods of their administration for surgical procedures within the upper part of the abdomen is a major problem. Three individuals must be considered—the patient, the surgeon and the anesthetist. The patient wants a method which will spare him any physical or mental suffering during the operation and which will give him the least amount of discomfort postoperatively. The surgeon desires that a condition be produced which will enable him to complete the operation expeditiously without causing undue trauma such as is necessitated when relaxation is inadequate. The anesthetist wishes to use agents and methods which will cause the least variation from the patient's normal physiologic processes and at the same time satisfy the surgeon's desire for relaxation. The anesthesia should not constitute a danger to life nor should it contribute toward the establishment of a high incidence of complications. To a great extent the choice of agents and methods hinges on the price one is willing to pay for the degree of relaxation that the surgeon with whom one is working requires.

When considering relaxation, it is well to remember certain fundamental facts. In the stage of full surgical anesthesia the motor centers in the spinal cord normally responsible for muscular tone are affected; their nervous discharges are lessened and tonus is diminished or abolished. Production of heat is decreased and circulation is depressed, particularly in the phase of venous return. The heart gradually fails for lack of adequate quantities of fluid against which to pump. Postoperative pulmonary complications occur as secondary sequelae owing to the fact that with both the intercostal muscles and the diaphragm atonic atelectasis is likely to develop.

Adequate relaxation is essential for the efficient performance of surgical procedures within the upper part of the abdomen. Extreme generalized relaxation maintained over a prolonged period is usually unnecessary and is frequently fraught with dangerous complications during and after operation. The necessity is for expeditious yet efficient progress in the course of the operation. The anesthetist is obligated to produce adequate relaxation when it is most needed for exploration, for the critical periods during the operation when precise manipulations are being undertaken and for the closure of the incision. It is also essential that unobstructed respiration be maintained with as little respiratory depression associated with the anesthesia as is feasible.

As in all other major surgical procedures, preoperative medication has an important bearing on the operative course. The patient should arrive in the operating room in a sufficiently drowsy state that recollection of the event will be hazy. At the same time, he should not receive so much medication that his vital functions

From the Department of Anesthesiology, Hartford Hospital.
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are inordinately depressed. The optimal state can usually be produced by administration of a moderately small dose of a barbiturate, such as pentobarbital sodium or sodium propyl-methyl-carbinyl allyl barbiturate given two hours before operation, and a moderately small dose of an opiate, such as morphine, given one hour before operation. If the patient is extremely apprehensive, pentothal sodium may be given intravenously while the patient is in his room. Some prefer administration rectally of a small dose of avertin with amylene hydrate in such instances. Atropine should be given to all patients, even when spinal or local anesthesia is contemplated. It serves not only to reduce the production of secretion within the respiratory tract but also to lower the irritability of the vagal centers.

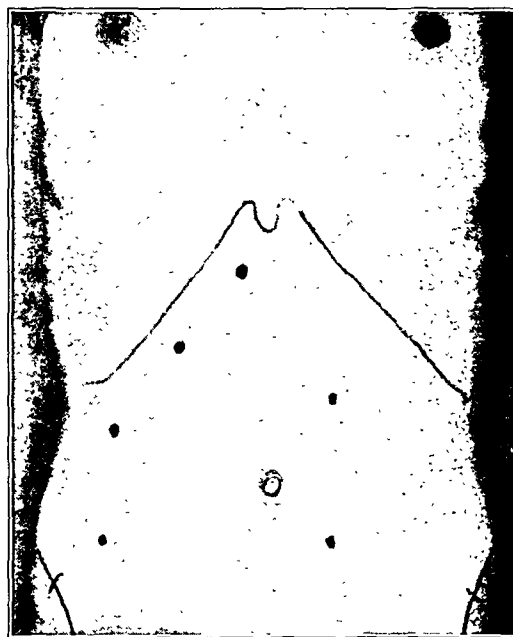
There are several methods that may be used, either alone or in combination, to produce anesthesia for these operative procedures—inhalation, intravenous, regional and spinal. Inhalation anesthesia has been and still is widely used. Administration of the gases nitrous oxide, ethylene or cyclopropane may not result in the production of adequate relaxation unless ether is added. Pentothal sodium administered alone is inadequate for anesthesia for upper abdominal procedures. In combination with abdominal block with procaine, it has been used at the Mayo Clinic with good results. Pentothal sodium in a concentration of 2.5 or 5 per cent in distilled water may be used, and oxygen should be administered throughout the operation.

The use of regional anesthesia without the administration of supplementary agents to produce general anesthesia is restricted in most instances to patients classed as poor risks. Finsterer employs an abdominal block for the incision of the abdominal wall. He next inserts several long slender retractors and a minimal amount of packing, thus providing a narrow channel leading down to the region of the first lumbar vertebra. He then inserts a long trocar with a retractable needle attached and injects procaine in 0.5 per cent solution retroperitoneally. By this method, pain of visceral origin is controlled. For extensive gastric resections his mortality rate is only 4 per cent.

McCarthy¹ describes a similar method and suggests that it may be the method of choice in certain types of cardiac decompensation, in acute respiratory and some chronic respiratory disorders, in oral or pharyngeal infections and in some cases of chronic nephritis and hypertension. He feels that it should also be used in the presence of marked or dangerous degrees of disturbance of acid-base equilibrium when time is not permitted to correct the condition. The method has never received wide acceptance in the United States, but Garth² suggests that many of the objections to the method could be obviated if general anesthesia produced by the intravenous administration of pentothal sodium should be employed during the manipulations necessary for the production of the splanchnic block. Lundy³ has reported a series of cases in which abdominal block and splanchnic anesthesia produced though the posterior approach were employed. Adequate relaxation was achieved in only 50 per cent of the cases and the method was abandoned. Abdominal

block, combined with the injection of from 75 to 100 cc. of 0.5 per cent procaine solution through the abdominal wall into the peritoneal cavity, has been employed with satisfactory results. The Trendelenburg position is employed in order to pool the free fluid in the region of the celiac ganglion.

The various agents and methods of their administration in spinal anesthesia for upper abdominal surgical procedures involve numerous and diversified factors which will be considered only briefly. In general it may be said that procaine will not produce relaxation of sufficient duration unless large doses are employed. The decrease in blood pressure will frequently be marked, and this reaction is frequently associated with the occurrence of nausea and vomiting. Pontocaine, although more toxic than procaine, may be used with the likelihood of sufficiently prolonged action. This drug may be dissolved in spinal fluid, mixed with procaine and diluted with spinal fluid or mixed with



Points of injection for an abdominal block preliminary to a cholecystectomy.

dextrose in 10 per cent solution. When the drug is dissolved in spinal fluid it is least controllable since it is practically isobaric. When it is mixed with procaine and diluted with spinal fluid the resultant mixture will in most instances be hyperbaric and the dose of pontocaine may be minimal. When it is mixed with dextrose 10 per cent a strongly hyperbaric solution will be obtained and sufficiently high spinal anesthesia may be most frequently attained, but the extension cephalad is so rapid that only an experienced anesthetist should employ the method. The latter method has been employed with considerable success by Sise⁴ and his co-workers at the Lahey Clinic.

Nupercaine is another agent used to produce prolonged high spinal anesthesia. It is used in a hypobaric solution in the manner outlined by the late Howard Jones. The drug is extremely toxic, and when it acts in untoward fashion cardiac action is influenced. It differs from both procaine and pontocaine in this

1. McCarthy, F. B.: Infiltrative Anesthesia in Surgery of the Gall-bladder, *Am. J. Surg.* 43: 728-733 (March) 1939.

2. Garth, W. L.: Some Observations of Anesthesia Abroad, *Anesth. & Analg.* 17: 292-297 (Sept.-Oct.) 1938.

3. Lundy, J. S.: Splanchnic Block, *S. Clin. North America* 5: 887-893 (June) 1925; Balanced Anesthesia and Splanchnic Block, *ibid.* 6: 1385-1395 (Oct.) 1926.

4. Sise, L. F.: Pontocaine-Glucose Solution for Spinal Anesthesia, *S. Clin. North America* 15: 1501-1511 (Dec.) 1935.

respect, and because there is little that one can do to rehabilitate cardiac action in comparison to what one can do to improve respiratory action nupercaine should probably be reserved for those patients for whom a particularly long operation is contemplated.

Dodd and Hunter⁵ and Organe⁶ have reported the use of nupercaine in spinal anesthesia in reduced doses combined with the administration of cyclopropane and nitrous oxide respectively. The advantages of these methods are quiet respiration, absence of nausea and vomiting during the operation and absence of psychic disturbances. In general, it may be said that minimal doses of any agent introduced intradurally should be employed. It is preferable to find it necessary to administer supplementary general anesthesia to ten patients rather than apply resuscitative measures to one.

At Hartford Hospital it has been our practice, for an increasingly large percentage of patients, to use abdominal block supplemented by general anesthesia produced by the administration of cyclopropane and oxygen. An endotracheal tube is inserted whenever it is deemed necessary for the maintenance of an unobstructed airway. When surgical procedures involving the stomach are undertaken, the intratracheal tube is surmounted by an inflatable cuff. Protection against aspiration of material forced up the esophagus can be provided. Small amounts of ether are occasionally added to facilitate intubation or in those instances in which sufficient depth of anesthesia with cyclopropane cannot be maintained without having untoward symptoms develop. The method of carbon dioxide absorption is employed, thus permitting control of the character of respirations without the necessity of producing extremely profound anesthesia which is associated with partial paralysis of the respiratory center and extreme muscular relaxation. It is felt that it is preferable to produce quiet breathing by removing the natural stimulus, carbon dioxide, rather than by paralyzing the respiratory center by means of an excessive concentration of the anesthetic agent. With this method it is possible to produce apnea during the critical stages of the operation when active diaphragmatic movement would otherwise hamper progress of the procedure.

For abdominal block, a solution of procaine and corbasil in physiologic solution of sodium chloride is used. Originally we used a solution of procaine in 0.5 per cent concentration, but experience has shown that better relaxation can more uniformly be obtained by using a solution containing procaine 1:100 and corbasil 1:40,000. The patient is anesthetized with cyclopropane and oxygen or with pentothal sodium administered intravenously. The method of blocking the intercostal nerves supplying the abdominal muscles is a modification of one described by Lundy. No attempt is made to raise a wheal intracutaneously nor is any attempt made to infiltrate subcutaneously. A 50 mm. needle attached to a 10 cc. syringe is inserted through the skin. Resistance will be encountered as the needle approaches the superficial fascia. The fascia is pierced and, after initial aspiration to test against the possibility of intravascular injection, 10 cc. of the solution of procaine is injected. The needle is withdrawn and the procedure is repeated at intervals of 80 mm. along the costal

margin and flank of the side of which incision is to be made, as shown in the illustration. Ten cc. of solution is deposited subfascially at each point through which the needle is introduced. Two injections into the upper part of the opposite rectus muscle completes the block. In patients with marked abdominal distention, in obese persons and in those who have a markedly distended gallbladder, great care must be taken not to introduce the needle too deeply. The peritoneum may be pierced and, although no damage will be done, the solution will to a great extent be wasted.

Reports of 300 patients undergoing 310 surgical procedures have been reviewed. Of the patients, 205 were women and ninety-five men. The youngest patient was 20 years of age and the oldest was 88. There were twenty-one patients between 20 and 30 years of age, sixty between 31 and 40 years, seventy-four between 41 and 50 years, seventy-three between 51 and 60 years, fifty-nine between 61 and 70 years and thirteen were over 70. For 139 operations the patients had inhalation anesthesia combined with abdominal block. This represents about 45 per cent of the series, and the predominance of this method was even greater in the latter part of the series. In seventy-nine instances endotracheal anesthesia was employed. The remaining 104 patients, 34 per cent of the group, received endotracheal inhalation. Fifty-one, or 16 per cent of the group, received inhalation only, and spinal anesthesia was employed for sixteen, or 5 per cent of the group.

An attempt has been made to evaluate the relative merits of the four anesthetic methods. In our opinion optimal conditions are produced with the greatest ease when abdominal block combined with the administration of cyclopropane and oxygen is employed. With this method relaxation could be obtained more frequently without the addition of ether vapor to the mixture, and when ether was employed the amount required was less than when the abdominal block had been omitted. The average operating time for patients receiving abdominal block was materially less than with the other methods that were employed. The incidence of postoperative complications was definitely less among the group receiving abdominal block than among those anesthetized by the other methods. Of the thirty-seven patients who died, six were subjected to secondary surgical procedures. For the forty-three operations, abdominal block was employed in only twelve instances.

SUMMARY

Abdominal block, as we have described it, is a relatively simple procedure. In hospitals in which the organization permits it, the block may be done by the anesthetist. Where this is not possible, the block can easily and rapidly be done by the surgeon before the incision is made. The method has been employed to advantage by us and it is becoming increasingly popular among surgeons. Satisfactory working conditions for the surgeon can be obtained without markedly disturbing respiratory function. It seems reasonable to limit marked muscular relaxation to the area for which it is necessary. This method is definitely preferable to infiltration of the muscles after the incision has been made. Tissues in the operative area are not edematous, and closure of the peritoneum is facilitated. A study of the incidence of postoperative complications indicates that abdominal block, employed in conjunction with inhalation anesthesia, is advantageous.

5. Dodd, Harold, and Hunter, J. T.: Cyclopropane "Sleep" with Nupercaine Spinal Anesthesia in Major Abdominal Operations, *Lancet* 1: 685-688 (March 25) 1939.

6. Organe, Geoffrey: An Anesthetic Technic for Upper Abdominal Surgery, *Anesth. & Analg.* 18: 339-342 (Nov.-Dec.) 1939.

ABSTRACT OF DISCUSSION

DR. JOHN S. LUNDY, Rochester, Minn.: It is important that methods of anesthesia be safe. There are several methods of local anesthesia used throughout the country. Infiltration is used, and abdominal block as you have heard it previously described is used when the skin is infiltrated as well as the subcutaneous tissues, and then Bartlett has just this year suggested blocking of the lower six intercostal nerves in the mid-axillary line, which is very effective. I think that this combination of inhalation anesthesia and abdominal block offers a great deal without demanding any great penalty. Many times a method of anesthesia may be very valuable in a large number of cases and every now and again there will be one that will not do well under that method. I think the hazards associated with this combination are less than with most other methods. In regard to the intravenous method of anesthesia, I might suggest that it is possible to use 50 per cent of nitrous oxide and 50 per cent of oxygen simultaneously with intravenous anesthesia. The 50 per cent of oxygen is ample for the oxygen needs, the 50 per cent of nitrous oxide reduces the dose of pentothal sodium necessary, and I believe that you will like it.

DR. ROBERT L. PATTERSON, Pittsburgh: Satisfactory anesthesia from the standpoint of the surgeon, anesthetist and patient for upper abdominal surgery continues to be a problem in many institutions throughout the country. It does not hold true that deep anesthesia produces, for the surgeon, satisfactory working conditions for upper abdominal surgery. Accompanying the so-called deep anesthesia is encountered partial or complete intercostal paralysis resulting in maximum diaphragmatic movement to compensate for lost intercostal action. Maximum diaphragmatic movement increases greatly the movement of the stomach and intestine. This in itself makes for anything but a quiet abdomen. As we have seen from the paper of Drs. Tovell and Hinds, this situation can easily be overcome by using a deep abdominal block to produce the required muscular relaxation and still maintain intercostal activity. With the loss of general muscular tone there is also an associated loss of pharyngeal muscular tone producing varying degrees of respiratory obstruction. Similarly, high concentrations of the anesthetic agent in the mixture often produce laryngospasm, further increasing the degree of obstruction. Combating this obstruction further increases the work of the diaphragm. This too can be overcome through the use of an endotracheal tube, thereby assuring a completely patent airway throughout the entire operative procedure. The only objection to this method of anesthesia for upper abdominal surgery is the time consumed in doing the block. The usual time required is about five minutes and may be started immediately following the induction of anesthesia. The reduction in operating time resulting from thorough relaxation and the ease with which exposure is obtained more than offset the time consumed in doing the block. The benefits derived from this method of anesthesia warrant its continued and increasing use not only for fair and poor risk patients but for all patients subjected to upper abdominal procedures.

DR. RALPH M. TOVELL, Hartford, Conn.: I consider this method technically easier, more freely adaptable and probably safer than intercostal block. So far as surface anesthesia is concerned, I see little necessity for that. One has already induced general anesthesia with cyclopropane. The method is applicable by either anesthetists or surgeons. It seemed worth reporting because it is simple to accomplish and the results are satisfactory.

Celebrated Victims of Gout.—Many celebrated men in history have suffered from gout, notably Martin Luther, Samuel Johnson, Darwin, Newton, Milton, Gibbon, the great physician Sydenham, Lorenzo the Magnificent, Louis XIV, Louis XV, Louis XVI—men famous for their abnormal appetites and over-indulgence in sweet wines. The familial tendency toward gout, so commonly supposed to be the only etiological factor in the disease, is probably much less important than faulty food habits. —Wolberg, Lewis R.: *The Psychology of Eating*, New York, Robert M. McBride & Co., 1936.

EARLY DIAGNOSIS AND PROGNOSIS
OF GASTRIC CARCINOMA

RUDOLF SCHINDLER, M.D.

CHICAGO

Cancer of the stomach is the most important malignant tumor. Deaths from this disease constitute from one fourth to one third of all deaths due to malignant tumors. Approximately 4 per cent of all adults die from cancer of the stomach.

Gastric cancer is not a disease of senility, although it occurs especially after the thirty-fifth year. And that is the reason why the systematic fight against this frequent disease looms as one of the most important tasks of the medical profession.

The attitude concerning the prognosis of this fight seems to have changed. Physicians of the older generation were thoroughly pessimistic, and usually still are pessimistic. Although many of them have seen an occasional cure by early surgery, they have observed that the vast majority of all their patients suffering from gastric carcinoma died. Public opinion was likewise pessimistic. Too many cases were known in which surgery had been attempted but in which death occurred nevertheless either soon after the operation or one or two years later. This thoroughly pessimistic attitude was perhaps justifiable at the time in spite of the fact that in quite a few cases prolongation of life was pro-

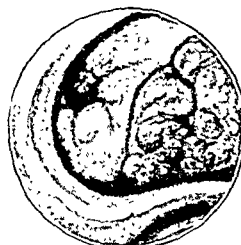


Figure 1.

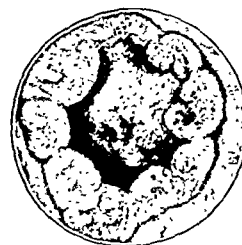


Figure 2.

Fig. 1.—Gastric carcinoma type 1. Gastroscopic view of antrum and pylorus. The curved line is the "angulus"; in the background the dark hole of the pylorus is seen; between 5 and 7 o'clock the fold of the "musculus sphincter antri" separates the antrum above from the body below. A polypoid nodular tumor, sharply circumscribed, is visible in the right side of the field. At gastroscopic examination the surrounding mucosa was completely atrophic and the tumor was dark red.

Fig. 2.—Gastric carcinoma type 2. Gastroscopic view. A large ulcer is seen in the center, surrounded by a nodular wall which is sharply limited toward the surrounding mucosa. In this view the nodular wall was dark red, the surrounding mucosa pale pink.

cured by gastric surgery. In recent times, however, and especially in the minds of our younger physicians, a more optimistic attitude has arisen. This is due to the statistics on surgery of gastric carcinoma published by leading clinics. Now the students of medicine are told that 20 per cent of all patients in whom a resection of gastric cancer has been carried out will survive longer than five years.¹ And this certainly is an impressive statement. The mental attitude resulting from this optimism is a gratifying one. More patients are now examined by special methods, such as x-rays and gastroscopy, at a very early stage; and laparotomy is advised in almost every case which seems to offer a possibility of cure. Nevertheless, one still finds practitioners who wait much too long before carrying out x-ray and gastroscopic examinations of patients suffering from minor abdominal distress, slight lack of appetite and beginning

From the Department of Medicine, University of Chicago.
1. Livingston, E. M., and Pack, G. T.: *End Results in the Treatment of Gastric Cancer*, New York, Paul B. Hoeber, Inc., 1939.

loss of weight. Under such circumstances delay is not merely unjustifiable; it is almost inexcusable.

However, from a therapeutic standpoint one cannot be very optimistic. The statement that 20 per cent of patients obtain at least a five year cure refers only to those in whom resection is possible and ignores those in whom it cannot be carried out. Probably not more



Fig. 3.—Carcinoma type 2, demonstrating the difference between the gross sharp limitation (fig. 4) and the microscopically undifferentiated character of the tumor (fig. 5). Gastrosopic view of the upper half of the tumor. At the right side the necrotic floor of the carcinomatous ulcer is seen. It is surrounded by a high sharply limited wall.

than 3 per cent of all patients with gastric carcinoma admitted to a clinic or hospital will be cured for five years or longer. And this is not a very encouraging result. However, these 3 per cent must be saved by all means, and therefore thorough examination is necessary and early surgery indispensable in every case in which the presence of metastases or the general condition of the patient does not make a successful operation impossible. This is not a satisfactory state of things. Many unsatisfactory laparotomies will in the long run destroy the confidence of public opinion and of

the physician as well; therefore, one of the chief problems of the physician is to find out whether he can distinguish before surgical intervention between the types of carcinoma giving a good surgical prognosis and those giving a hopeless one.

In a recent discussion on gastric carcinoma a pathologist, Dr. Paul Steiner, stated, in my opinion quite correctly, that our knowledge of gastric carcinoma is rather inadequate. We are, he said, at about the same stage as we were with brain tumors before some neuropathologists and neurosurgeons, especially Bailey, began to classify the brain tumors and to try to treat these tumors according to the classification. It seems to me that this would be the proper procedure in gastric carcinoma also. Now the physician does not differentiate between the prognosis of different forms of gastric carcinoma; he treats all of them in the same way. In my opinion, this is one of the chief reasons why there are so many failures in gastric surgery. If it could be established that gastric carcinoma resembles brain tumor as far as some forms give in the average a very good prognosis and other forms a definitely bad prognosis, then one could try to diagnose these different forms before surgical intervention. And the surgeon refusing to operate on forms with a bad prognosis would suddenly increase the percentage of successful operations. As a result, it would become known generally that if surgery for gastric carcinoma is undertaken the patient will usually be saved.

In the case of the brain tumor previously mentioned such a differentiation has been possible. Whether it will be possible in the case of gastric carcinoma also remains to be seen. Closest cooperation among practitioners, surgeons, roentgenologists and pathologists over a long period of years and a most careful work-up of every case, and especially of the pathologic material obtained, will be necessary. Steiner stated that it is not even known as yet which gastric carcinomas develop from the surface epithelium, which from the chief cells, which from the parietal cells, which from the Brunner glands and so on. Do all these tumors give similar pathologic or clinical pictures? As soon as the ques-

tion of classification comes up (or may I say of typology, although this is not an accepted word) I feel that the study of gastric carcinoma is just beginning. Our present knowledge is not very extensive. It is known that gastric carcinoma has usually been subdivided according to rather superficial morphologic criteria such as differentiation of the cells, amount of connective tissue present and so on (adenocarcinoma, colloid carcinoma, medullary carcinoma, scirrhous). Almost every author describing the microscopic picture of gastric carcinoma adds his own classification, and all these classifications have proved not to be of great value for the practical procedure of the surgeon, and especially not for the prognosis.

CLASSIFICATION OF GRADES AND TYPES

Broders² has tried to grade various malignant tumors according to the malignancy of the cells seen. For this grading he used figures of percentage. I believe that this method is not very exact in the case of gastric carcinoma, because one may often see in a portion of the tumor well differentiated, benign looking cells and in other portions large sheets of undifferentiated cells which appear to be very malignant. However, one may attempt to estimate the degree of malignancy of a gastric tumor according to the apparent differentiation of the carcinoma cells. A tumor with a marked differentiation of cells with formation of tubules which look almost like those of a benign tumor may be called a grade 1 carcinoma. If the tubules become more irregular, if their epithelium consists of several layers and if papillae are seen in their lumens, the tumor may be called a grade 2 carcinoma. If the carcinoma is still able to form some tubules but consists mostly of coherent sheets of cells, it might be called a grade 3 carcinoma. If no formation of adenomatous tissue is seen and if the cells are of various sizes, the tumor may be called a grade 4 car-



Fig. 4.—Carcinoma type 2. Gross appearance of lesion shown in figure 3 after resection. The sharply limited character of the lesion is well seen.

cinoma. Livingston and Pack seem to believe that such grading may permit one to a certain extent to make statements about the prognosis of a gastric carcinoma, but I doubt whether this is true. They contend that 60 per cent of patients having had a resection for a grade 1 or grade 2 carcinoma will survive the opera-

2. Broders, A. C.: Carcinoma Grading and Practical Application, Arch. Path. 2: 376 (Sept.) 1926.

tion for more than five years, as compared with 20 per cent of all patients having had a resection. If this statement were true it still would not add much encouragement, because grade 1 and grade 2 carcinomas are rare.

I believe that such a statement is even misleading. For more than ten years I have had the impression that it is not the microscopic structure on which the final prognosis of a gastric carcinoma will depend. At one time I observed an exceptionally small pyloric tumor which grossly did not show any sharp demarcation and was an invading type of carcinoma. However, the pathologist who examined this tumor microscopically stated that it consisted of tubules of such regular structure that he was inclined to diagnose it benign tumor. This evidently was a typical grade 1 carcinoma. Nevertheless, mucosal metastases developed four months later and the patient died a short time after that from generalized carcinomatosis. From this time on I had the growing impression that the microscopic type of a gastric carcinoma is less decisive for the final prognosis than its macroscopic character. In the case just mentioned a beautifully differentiated tumor was growing infiltratively and the early operation was of no avail.

Borrmann³ in his chapter on gastric tumors has given a macroscopic classification of gastric carcinoma which is now widely accepted and which is used everywhere in the gastroscopic description of gastric tumors. Borrmann is a pathologist and therefore is able to describe only the pictures he sees in postmortem specimens. The pathologist is not able to state whether the types he describes are entities or whether there are transitions between the different types; that is, whether one type can at a later stage develop into another type.

The first gross type of gastric carcinoma is the polypoid carcinoma (fig. 1). This is a sharply limited growth often looking like a mushroom with overhanging edge, its surface presenting numerous nodes and nodules which usually are of different sizes. Only at a very late stage will ulceration of this surface develop. The mucosa surrounding this type of tumor is often thoroughly atrophic. This type is not a frequent one. According to my own statistics⁴ it is found in 2.9 per cent of all gastric carcinomas, if carcinoma of the cardia is omitted. In my experience this type grows slowly and, it seems, never changes into another type but remains polypoid and sharply limited. Microscopically most tumors of this group are well differentiated adenocarcinomas, and it seems that their radical operation at not too late a stage gives a very good prognosis. However, these tumors are not frequent, and further observations are necessary.

Type 2 is a very important form (fig. 2). It is found rather frequently, namely in 17.6 per cent of all cases. It is an ulcer surrounded by an elevated wall. This wall has a steep slope toward the surrounding mucosa and is sharply demarcated all around against the surrounding mucosa. The floor sometimes shows necrotic material of all colors—brown, purple, gray, dark red or white. Sometimes necrotic, gray white crystal-like excrescences can be seen floating in the current of air introduced during the examination. The wall may be smooth, or more frequently it is nodular and

contains shallow erosions. Its dark red color then is in marked contrast to the pale color of the surrounding mucosa. Since the surgeon tries to operate as soon as possible on these tumors he rarely has the opportunity to watch gastroscopically their course over a long period of time, but sometimes the patient may refuse the immediate operation and then such an observation may become possible. Within only one week the thickness of the wall may double. However, I have never seen this sharply limited wall become diffusely infiltrative at a later stage. The number of such observations is naturally still too small to permit the definite statement that



Fig. 5.—Carcinoma type 2. Microscopic section through the edge of the tumor shown in figures 3 and 4 with the adjacent atrophic gastric mucosa. The tumor is sharply demarcated but consists, nevertheless, of undifferentiated cells of an apparently highly malignant character.

such a transition is never possible. The observation, nevertheless, is an amazing one because the microscopic structure of these carcinomas is not a uniform one. They often show little differentiation and look rather malignant microscopically (figs. 3, 4 and 5).

The startling point about these type 2 carcinomas is that metastases develop at a relatively late stage and often lead to an extremely satisfactory end result, to cures of long duration if an operation can be performed at not too late a moment, whatever their microscopic structure may be. These are the well known tumors which may reach the size of a fist, which can well be palpated through the abdominal wall and which are definitely movable. This is the form of carcinoma which at x-ray examination frequently gives the so-called meniscus sign of Carman. Figure 6 gives the x-ray appearance of a typical type 2 carcinoma presenting the so-called meniscus sign. Although this type 2 carcinoma was located almost immediately below the cardia, total gastrectomy led to a five year cure.

In the type 3 carcinoma of Borrmann (fig. 7) an ulceration is found also. This ulceration has a wall, but

3. Borrmann, R., in Henke, F., and Lubarsch, O.: *Handbuch der speziellen pathologischen Anatomie und Histologie*, Berlin, Julius Springer, 1926, vol. 4, pt. 1, p. 865.

4. Schindler, Rudolf: Incidence of the Various Types of Gastric Disease as Revealed by Gastroscopic Study, *Am. J. M. Sc.* 197: 509 (April) 1939.

the wall is found only at one side of the ulcer and does not slope as steeply as does the wall of the type 2 carcinoma. There is a more gradual transition, and the ulcer itself, although sharply limited at one side, blends diffusely at the other side, and there diffuse and progressive infiltration of the neighboring mucosa is seen.



Fig. 6.—Gastric carcinoma type 2. Typical meniscus sign of Carman. The barium fills the cavity of the ulceration. The white margin that surrounds this cavity and interrupts the course of the normal gastric rugae represents the carcinomatous wall.

This type 3 carcinoma occurs in 16.3 per cent of all cases. Here again the microscopic pictures are not typical at all.

The type 4 tumor of Borrmann is the diffuse infiltrating type, which unfortunately occurs in 63.2 per cent of the cases. No sharp limit will be found anywhere toward the normal gastric mucosa either with the eye or by palpation; sometimes the entire stomach may be infiltrated (fig. 8). In this case, in which the stiff nodular infiltration is seen, the entire stomach was found gastroscopically to be involved at the very first observation almost two years before the patient died. Within this infiltration, ulceration may develop—shallow ulcers or deep ones. They never show the sharp edge of the typical benign ulcer. These type 4 carcinomas seem to be not very favorable tumors. I have never seen a complete cure after the resection of such a tumor, but naturally the material is too limited to permit any definite conclusions.

In the extensive research which should be undertaken within the next decades concerning classification or typology of gastric carcinoma, both the gross and the microscopic structure should be studied carefully with the hope of coming to a surgical prognosis based either on the microscopic examination of gastroscopic biopsies or on the gross gastroscopic or roentgenologic appearance of the tumor, without exploratory laparotomy.

Thus far I have been able to collect thirty-nine cases in which such a study was possible. The results are given in the accompanying table. The microscopic grades are listed, approximately estimated according to Broders' criteria; and the gross types are listed according to Borrmann. There is no microscopic grade 1 in this material. The four cases which would constitute a microscopic grade 2 are evenly distributed over the four

types. One of these Broders grade 2 tumors belonged to the Borrmann type 1. The patient is still alive after two and one-half years and without any sign of recurrence roentgenologically and gastroscopically. Another Broders grade 2 carcinoma belonged gastroscopically to the Borrmann type 4; this patient, at the operation, exhibited carcinomatous invasion of all lymph nodes.

It is interesting to note that many of the sharply walled off type 2 carcinomas belong microscopically to grade 4. The fact that there is no relation between the microscopic grades and the macroscopic types is established, and this fact should be borne in mind for future research.

PRECANCEROUS CHANGES

So much for the classification and typology of gastric cancer. Now what can be said with regard to the subject of precancerous changes in the gastric mucosa? Today it is a widely accepted theory that carcinoma does not develop on the soil of an entirely healthy mucosa. Some European workers⁵ go so far as to contend that no gastric carcinoma ever develops in a perfectly normal mucosa. It has been alleged that there are conditions of the mucosa which must be considered precancerous. If this is true, then evidently a new approach has been found. And this concerns the truly early diagnosis of gastric carcinoma. Every carcinoma starts with a few malignant cells. Perhaps one cannot hope ever to dis-

Comparison of Macroscopic Types and Microscopic Grades of Thirty-Nine Gastric Carcinomas

Grades		1	2	3	4	Total
Types (of Borrmann)	I.....	..	1	..	..	1
	II.....	..	1	3	9	13
	III.....	..	1	3	4	8
	IV.....	..	1	3	13	17
Total.....		0	4	9	26	39

cover the stage in which only a few cells are malignant, but even in the most malignant growth there may be a stage of dividing malignant cells which have not yet invaded the lymph vessels but which are restricted to the gastric mucosa itself, forming a small pathologic area which may be recognized. Such truly early carcinomas, carcinomas of minimal size, cannot possibly cause any symptoms, even if they are located in the

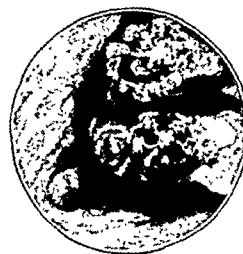


Figure 7.

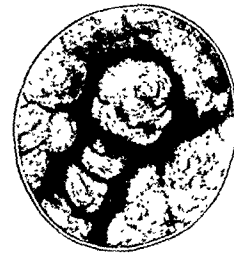


Figure 8.

Fig. 7.—Gastric carcinoma type 3. Gastroscopic view, showing along the greater curvature in the center of the field the wall of a small ulcerated carcinoma, but at the right side the carcinomatous infiltration reveals gradual transition into the gastric wall. Gastroscopically the gastric mucosa on the left side was gray and atrophic.

Fig. 8.—Gastric carcinoma type 4. Gastroscopic view showing stiff infiltration with formation of thick nodes.

pyloric region. And therefore a truly early diagnosis of such carcinomas of minimal size can be made only incidentally. One should attempt to find them when

5. Konjetzny, G. E.: Chronische Gastritis und Magenkrebs. *Monatsschr. f. Krebsbekämpfung*, 2: 65 (March) 1934. Hurst, A. F.: Schorstein Lecture on Precursors of Carcinoma of the Stomach, *Lancet* 2: 1023 (Nov. 16) 1929.

they do not cause any symptoms. If this could be accomplished then one might hope to discover all types of gastric carcinoma at such an early stage as to permit complete cure by immediate surgery. The way to accomplish this is to discover the precancerous conditions of the gastric mucosa and to watch such patients carefully. More important still is the task of finding the cause of these precancerous changes and a means of eradicating them before they develop further.

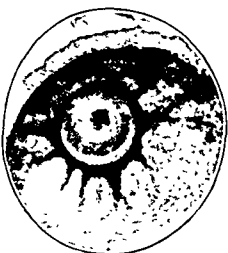


Fig. 9.—Adenomatous polyp of the stomach. The closing pylorus is seen in the center of this gastroscopic view and a cherry sized polyp is located in the pyloric ring.

What are these precancerous conditions? Three diseases have been considered forerunners of gastric carcinoma: (1) benign gastric ulcer, (2) benign gastric polyp and (3) chronic atrophic gastritis.

1. Benign Gastric Ulcer.—

For a long time the opinion was prevalent that many gastric carcinomas develop on the soil of gastric ulcers. This opinion, however, is now almost untenable. Dr. Walter Lincoln Palmer⁶ contends that the existence of carcinomatous degeneration in benign ulcer remains to be proved conclusively. Gastro-enterologists who carefully watch their ulcer patients over a period of several decades have never seen such an ulcer develop into a carcinoma. Peptic ulceration of carcinoma may produce a lesion grossly indistinguishable from benign ulcer. Indeed, there is evidence that the carcinoma may be completely digested away by peptic activity, leaving a typical benign ulcer.⁷ Probably a carcinomatous ulcer is malignant from the beginning. From 3 to 4 per cent of all adults die from gastric carcinoma, and therefore it has to be expected that from 3 to 4 per cent of all ulcer patients will develop a gastric cancer also; but the causal connection is hard to establish. For all these reasons it is no longer believed that benign ulcer is important as a precancerous condition. Ulcer patients who are being treated conservatively will naturally be watched, and development of a carcinoma in an ulcerous stomach will not be overlooked easily. Preventive resection of a benign ulcer to avoid development of carcinoma is hardly advisable.

2. Benign Gastric Polyps.—These are more frequent than is generally recognized. The smallest ones are easily overlooked at x-ray examination and, indeed, at postmortem examination. There is not yet a generally accepted classification of the benign gastric polyps. McGlone and I⁸ have suggested that we consider three groups of them. The first of these groups belongs essentially to the entity of atrophic gastritis. The hemispherical excrescences, seen sometimes to cover the entire mucosa of the antrum, appear to be inflammatory formations growing on the soil of atrophic gastritis and consisting of connective tissue containing only a few tubules. However, Konjetzny has demonstrated that this type of pseudopolyps frequently develops into carcinoma and has recommended resection in such cases in order to prevent formation of carcinoma.

The second type of gastric polyp is the truly benign adenoma, being the size of a pea up to that of a cherry. If the polyp is the size of a cherry, as shown in figure 9,

it may be well demonstrated by x-ray examination too (fig. 10). But if these polyps are very small they may escape easily the demonstration by x-rays. The gastroscopic picture is unmistakable. They may be single or multiple. These tumors are frequently found associated with atrophic gastritis also, especially in pernicious anemia; but the microscopic structure is that of a true adenoma. Their epithelium is undifferentiated, not showing any typical cells of the gastric mucosa. Grier Miller⁹ and many other authors have contended that within these true adenomas gastric carcinoma will frequently develop.

The third type of benign mucosal polyp has been seen in only one case. This is the hyperplastic polyp originating in a hyperplastic mucosa. At operation in this case nothing could be felt at palpation from the outside of the stomach, but when the stomach was opened it was possible to remove with the fingers several rather hard benign tumors. Microscopically this type of tumor does not show the undifferentiated epithelium of the true adenoma, but it contains the cells of the gastric mucosa, chief cells and parietal cells; therefore, it can hardly be considered a true tumor but a kind of hyperplastic formation. I believe this should be called hyperplastic polyp. It is well known that in hyperplastic polyps of the intestine carcinoma frequently develops, but whether or not this is true for these hyperplastic polyps of the stomach is not yet known.

3. Chronic Atrophic Gastritis.—The recognition of gastric polyps is important, but from the standpoint of frequency and as a forerunner of gastric carcinoma this third condition to be considered is of much greater importance. Its clinical symptoms, the gastroscopic signs and the complications of this frequent disease have been described elsewhere. Pathologically it consists of a thinning of the gastric mucosa, the glandular apparatus of which disappears slowly and is replaced by cellular infiltration. The epithelium often undergoes transition into the intestinal type of epithelium with many goblet cells. At gastroscopy are seen thinning and graying of the mucosa with visible branching blood vessels.

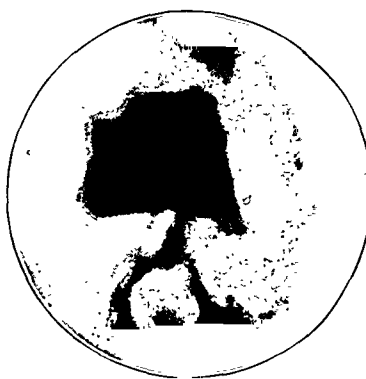


Fig. 10.—Adenomatous polyp of the pylorus. X-ray relief compression view. In the upper half the cap of the duodenum is seen. In the lower half is the prepyloric region, which contains a sharply circumscribed filling defect.

Patients usually complain of minor epigastric distress, pressure, belching, bloating and sometimes ulcer-like pain. But their general symptoms—extreme fatigue coming in spells, headache, nervousness, numbness and tingling of the limbs—are more characteristic. If it is

stated that this disease may frequently be the forerunner of gastric carcinoma, then this seems to be in complete contradiction to the old conception that gastric carcinoma usually develops in entirely healthy persons. But in the light of later investigations it seems that this old conception is true only in a

6. Palmer, W. L.: Benign and Malignant Gastric Ulcers, *Ann. Int. Med.* 13: 317 (Aug.) 1939.

7. Ewing, James: Etiological Indications of Early Gastric Cancer, *Rev. Gastroenterol.* 7: 305 (July-Aug.) 1940.

8. Schindler, Rudolf, and McGlone, F. B.: Familial Occurrence of Hyperplastic Gastric Polyps, *Arch. Surg.*, to be published.

9. Miller, T. G.; Eliason, E. L., and Wright, V. W.: Carcinomatous Degeneration of Polyp of the Stomach, *Arch. Int. Med.* 46: 841 (Nov.) 1930.

rather small percentage of cases. At different localities attempts have been made to clarify this question, and the respective workers have arrived at amazingly similar results. Kapp¹⁰ of Basel, Switzerland, found that more than 13.4 per cent of his cases of gastritis later developed into carcinoma. The figure of Usland¹¹ of Drontheim, Norway, is 15 per cent, and this incidence is about three times that of gastric carcinoma in general. These observations support the observations of Saltzmann¹² and of Konjetzny⁵ on atrophic gastritis leading to gastric carcinoma. I believe that one frequently does not study the case history of patients suffering from gastric carcinoma carefully enough. The patient seeing the physician at a rather late stage of the disease is overwhelmed by his experience of the last months, the disappearance of his appetite and the terrifying loss of weight, and he is inclined to forget that for many years he has been suffering from abdominal distress. On the other hand, I am not inclined to believe that every gastric carcinoma develops on the soil of atrophic gastritis.

If it is true that patients with atrophic gastritis have three times as much chance to develop a gastric carcinoma as healthy adults, then it is the obvious duty of physicians to diagnose this disease as early as possible and watch these patients closely by frequent x-ray and gastroscopic examinations. The

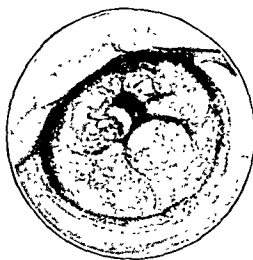


Fig. 11.—Early diagnosis of an unusually small gastric carcinoma as a result of the routine examination of a patient suffering from atrophic gastritis. In the center of this gastroscopic view the distorted pylorus is seen containing a small grayish ulceration. At gastroscopic examination the mucosa of the antrum was greenish gray, indicating atrophic gastritis. Microscopic examination of the resected specimen revealed an early carcinoma 8 mm. wide and from 0.5 to 2 mm. deep.

correct diagnosis of atrophic gastritis is possible only gastroscopically, and the gastroscope in my opinion will have its chief significance in the diagnosis of this important disease. When the diagnosis is once established, routine rechecks should be made by x-ray examination and, if feasible, also by gastroscopy.¹³

Three cases which proved that such a procedure may lead to the discovery of extremely small carcinomas and to a really early diagnosis of gastric carcinoma have been published elsewhere¹⁴ and will be summarized here briefly. In the first of these cases the early diagnosis was not made because of a misinterpretation of the x-ray film, but this case shows better than any other the typical course and the diagnostic possibilities that I have discussed:

A man aged 58 had suffered for twenty years from abdominal distress consisting of pains, belching, pressure and the like, all the symptoms coming on in attacks. Ten years before I saw him the gallbladder had been taken out and found filled with pus, but his distress continued. After this operation many tests of gastric acidity were made, always showing a histamine proved anacidity. There was a progressive state of weakness and fatigue developing into marked exhaustion on little effort. As a result the formerly active man was compelled to curtail

his activities. Often he was forced to leave his work in order to have dietary treatment. This course, in my opinion, is one typical of atrophic gastritis. Severe attacks of weakness leading almost to incapacitation were present. Abdominal symptoms were found, and histamine proved anacidity was stated at repeated occasions. Three years before his admission to Billings Hospital a very small filling defect of the greater curvature was found and interpreted as a spasm. This apparent spasm was seen at several reexaminations. Retrospectively it is quite obvious that, by means of a gastroscopic examination and probably by a careful relief x-ray examination also, the presence of a tumor would have been diagnosed immediately. When this filling defect grew in size the patient wanted to have a gastroscopic examination (fig. 1). A type 1 carcinoma was found. This tumor was lying in a completely atrophic mucous membrane. Down from the cardia to the pylorus the gastric mucosa was thin and greenish gray, contrasting characteristically with the dark red of the tumor. The microscopic examination showed in the most perfect way the transition of a really atrophic mucosa into tumor tissue.

The second case does not show this connection quite so convincingly but it is striking because a minimum sized carcinoma was discovered incidentally:

The patient had suffered from gnawing epigastric distress two hours after meals for one year, associated with belching and poor appetite. He had had several attacks of severe nausea. After his admission to Billings Hospital he had the usual complete check-up, and Dr. Frederic Templeton at x-ray examination was able to demonstrate a fleck suggestive of pyloric ulcer. The differential diagnosis between benign and malignant ulcer was difficult. The gastroscopic examination did not permit any doubt that this was a very small pyloric carcinoma (fig. 11). At gastric analysis 65 units of free acid was found; however, this frequently happens in atrophic gastritis. In spite of the definite gastroscopic diagnosis of malignant lesion, the surgeon was not able to feel anything definite at operation; but at our request he made a resection. In the gross specimen a very small, shallow ulcer was seen. It was assumed to be a benign ulcer, and only at microscopic examination was it shown that the floor of the ulcer consisted of carcinoma. This carcinoma had a width of 8 mm., and a depth of 0.5 mm. at one place and 2 mm. at another place. It is by far the smallest carcinoma that I have ever seen, and I am rather convinced that this small lesion did not produce symptoms of one year's duration but that these symptoms were due entirely to the atrophic gastritis.

In this case we were not able to prove definitely that the discovery of the small carcinoma was purely accidental, although this seems to be very likely; but in the following case there cannot be any doubt about the accidental discovery of a small carcinoma by a routine check-up:

A patient suffering from pernicious anemia and cord degeneration presented himself for a check-up. At x-ray examination nothing was found. Probably this was partly due to the fact that the patient had great difficulty in standing up because of his organic nervous condition. At gastroscopy the usual atrophic mucosa of pernicious anemia was seen, and when the gastroscope was rotated in the middle portion of the stomach a small type 3 carcinoma was seen to lie in atrophic mucosa (fig. 7). Microscopic examination revealed severe atrophic gastritis characteristic of pernicious anemia.

SUMMARY

The present approach to the fight against gastric carcinoma is not an entirely satisfying one. It has been suggested that a better classification of different forms be found in the hope that a reliable prognosis may become possible before surgical intervention. Emphasis has been given to the importance of the early diagnosis

10. Kapp, H.: Zur Bedeutung der Anamnese des Magenkarzinomas, Cong. internat. de gastroenterol., 1937, p. 355.

11. Usland, Olav: Ueber die Bedeutung der chronischen Gastritis für die Entwicklung des Magenkrebes, Acta chir. Scandinav. 76: 485, 1935.

12. Saltzmann, J.: Magenkrebs mit besonderer Berücksichtigung der Frühdiagnose, Arb. a. d. path. Inst. d. Univ. Helsingfors, 1935.

13. Schindler, Rudolf: Die Bedeutung der Gastroskopie für die Heilung des Magenkrebes, Monatschr. f. Krebsbekämpfung, 1: 203 (May) 1933.

14. Schindler, Rudolf, and Gold, R. L.: Gastroscopy in Gastric Carcinoma, Especially in Its Early Diagnosis, Surg., Gynec. & Obst. 69: 1 (July) 1939.

and treatment not only of gastric cancer but also of the precancerous conditions of the gastric mucosa—polyps and especially the frequent and important chronic atrophic gastritis. Such early diagnoses are obviously possible only if routine x-ray and gastroscopic examinations are made. Only in this way will it be possible to discover true early carcinomas of minimal size and thus permit really early surgery and thus obtain a higher percentage of real cures and a greater prolongation of life.

TREATMENT OF FRACTURES OF ULNA WITH DISLOCATION OF HEAD OF RADIUS

(MONTEGGIA FRACTURE)

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Fracture of the ulna associated with dislocation of the head of the radius was described by Monteggia in 1814 and is often called by his name. During the past twelve years thirty-four articles dealing with this subject have appeared in the literature, and of these only two have been in English. The fact that the lesion is difficult to treat and the end results are often disappointing may account for the paucity of English literature on the subject.

The present study is based on a series of sixty-two injuries of this type which have been treated by the members of the staff of the Willis C. Campbell Clinic. Thirty of the patients had acute fractures, ten of which were compound. The remaining thirty-two patients had old injuries, having been first seen four weeks or longer after the accident.

The dislocation of the head of the radius was anterior in $83\frac{1}{3}$ per cent of the patients, posterior in 10 per cent and lateral in $6\frac{2}{3}$ per cent. The ulnar fractures were distributed as follows: 5 per cent involved the olecranon at the level of the elbow joint; $66\frac{2}{3}$ per cent, including fractures at the junction of the upper and middle thirds of the ulna and excluding the 5 per cent involving the olecranon, were in the upper third of the ulna; $18\frac{1}{3}$ per cent were in the middle third, and 5 per cent were in the lower third. In 5 per cent of the cases the dislocation was associated with a fracture of both the radius and the ulna.

MECHANISM

A Monteggia fracture may be produced by an indirect force, although as a rule the injury is caused by a direct blow on the forearm. Since the radius and ulna are well united by the interosseous membrane and the ligaments in the regions of the elbow and wrist, forces of this type ordinarily fracture both bones. Occasionally the annular ligament is ruptured and as a consequence the head of the radius is dislocated; or, even more rarely, the head of the radius is pulled out of the annular ligament. In either event the dislocation usually prevents fracture of the radius. If the force is excessive a dislocation of the radial head may be associated with a fracture of both bones of the forearm.

SYMPTOMS AND MANIFESTATIONS

The fracture of the ulna is usually evident from the history and physical manifestations. If the fracture is 2 inches or more below the elbow joint the proximal fragment is almost invariably angulated toward the radius, probably by the pull of the supinator muscle. The tendency toward this deformity is so strong that it will usually recur in a cast, even following open reduction and wiring of the fragments.

When one encounters a fracture of the ulna with angulation or overriding and without a fracture of the radius, a dislocation of the head of the radius should be suspected. In anterior dislocations the radial head can generally be palpated anterior and proximal to its normal location, this position being aided by the pull of the biceps tendon. A depression is palpable just anterior and distal to the capitellum. In posterior dislocations the head of the radius is palpable distal and posterior to the capitellum. In either type, attempts to pronate and supinate the forearm provoke pain at the elbow.

In making roentgenograms of fractures of the ulnar shaft, the elbow joint should always be included on the film. Failure to do so may lead to a grave error in diagnosis and to permanent deformity. One should

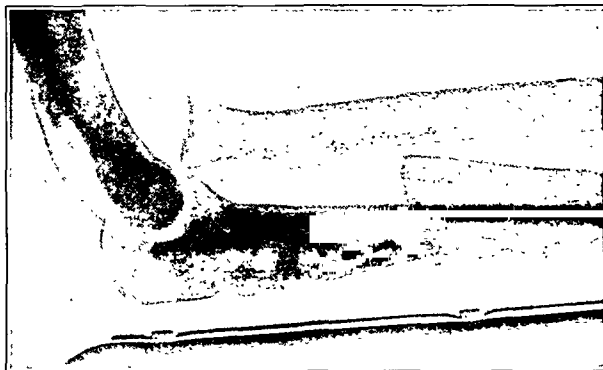


Fig. 1.—Lateral view of acute fracture of the ulna with dislocation of the head of the radius in patient aged 20 years.

not forget that, even in fractures of both bones of the forearm in the upper third, a dislocation of the radial head may be present.

TREATMENT OF ACUTE FRACTURES IN ADULTS

In some cases, manipulation will effectually replace the head of the radius and restore the fragments of the ulna to a satisfactory position. Following reduction of an anterior dislocation the extremity should be immobilized with the elbow in flexion and the forearm in supination; this position relaxes the biceps and supinator muscles, thus diminishing the upward pull of the biceps on the radial head and the radial pull on the ulna by the supinator. The position of flexion most successfully prevents recurrence of the dislocation. After correction of a posterior displacement, immobilization of the extremity with the elbow in extension and the forearm in supination may be necessary, since flexion of the elbow may lead to a recurrence of the dislocation; in this event, flexion should be gradually resumed as early as feasible. If possible, however, immobilization of the elbow in extension should be avoided. In only one of our cases was it necessary to maintain the elbow in extension. The patient obtained a good functional result, flexion and extension ranging from 45 to 180 degrees.

Seldom are good end results secured by closed reduction in adults. Replacement of the head of the radius is often difficult because of interference by the ruptured annular ligament, and, if the head of the radius is pulled out of the ligament, replacement by the closed

tion, led to the treatment of these fractures by open reduction and internal fixation by means of a vitallium plate and screws. In our experience this method has proved the best insurance against angulation of the ulna, wire loops or other measures having failed to prevent radial deviation (figs. 1 and 2).

Reduction of the head of the radius may be maintained by (1) repairing the ruptured annular ligament or (2) passing a silk or wire suture or a strip of fascia around the neck of the radius and fixing it to the ulna. Both practically and theoretically the use of the fascial strip is the most satisfactory of these methods, since fascia forms a broad living ligament more nearly resembling the normal structure. Usually the annular ligament is too badly damaged to provide an adequate amount of tissue for a good repair, and silk and wire tend to cut into the neck of the radius and break following use.

When the head of the radius is fractured as well as dislocated, removal of the fragment or of the entire head is indicated, depending on the severity and extent of the fracture.

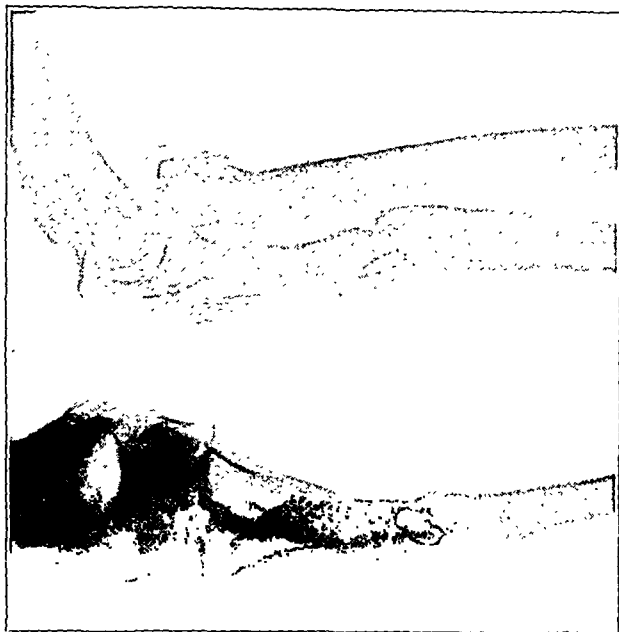


Fig. 2.—Lateral and anteroposterior views of same arm shown in figure 1 four months following fracture, showing radial angulation of the ulna and subluxation of the head of the radius. This illustrates the fact that wiring of the fragments will not prevent radial deviation of the ulnar fragment. Roentgenograms taken six years postoperatively showed a similar angulation of the ulna. The patient has severe limitation of pronation and supination.

method is practically impossible. Further, external fixation alone fails to prevent radial deviation of the proximal ulnar fragment. If the angulation of the ulna

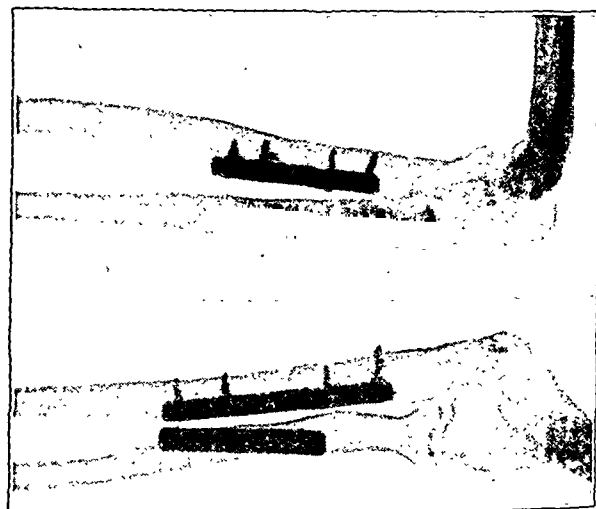


Fig. 4.—Lateral and anteroposterior views of same arm shown in figure 3 six months postoperatively. Vitallium plates were applied to the fractures of the ulna and radius, and a fascial loop was passed around the neck of the radius. The entire procedure was carried out through the one incision described in this paper.

The operation in its most elaborate form calls for an incision for exposure of the ulnar fracture, a second incision over the head of the radius and the removal of a strip of fascia lata from the thigh. In an effort to simplify the procedure, a single incision has been developed through which the fracture of the ulna and the dislocation of the head of the radius can be reached, and the fascia can be obtained locally to form a loop about the neck of the radius.

Operation.—An incision is made along the lateral side of the distal 1 inch of the triceps tendon and is continued distally along the subcutaneous border of the ulna as far as necessary for exposure of this bone. The insertion of the anconeus muscle is reflected subperiosteally from the upper $2\frac{1}{2}$ inches of the ulna, together with the origin of the supinator muscle, that portion of the supinator which arises from the ulna distal to the radial notch being divided close to the bone. On reflection of this muscular flap laterally, the head and neck of the radius and the radioulnar joint are exposed. The deep branch of the radial nerve is protected in the substance of the supinator muscle.

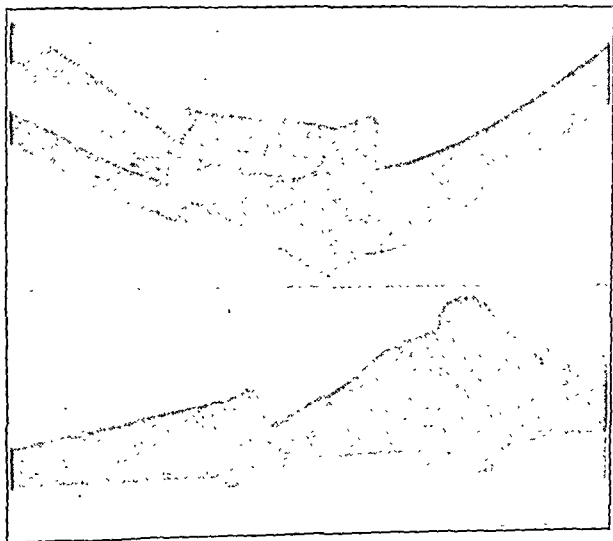


Fig. 3.—Lateral and anteroposterior views of acute fracture of both bones of the forearm with dislocation of the head of the radius in patient aged 17 years.

recurs sufficiently to produce an appreciable shortening, subluxation of the radial head will ensue or, if the fragments disengage and overlap, the dislocation will recur. The persistent tendency toward radial deviation of the ulnar fragment, usually associated with malunion and partial or complete recurrence of the radial disloca-

This approach extends only to the upper margin of the interosseous membrane. In the presence of a fracture of the upper third of the radius, reduction and internal fixation of the fragments are also possible through the one incision, by reflection of the muscles laterally along the dorsal surface of the membrane until the shaft of the bone is reached. In this manner, access is gained to the upper third of the radius without exposure or damage of the deep branch of the radial nerve. Separation of the muscles from the interosseous membrane necessitates division of the dorsal interosseous artery; no harm has resulted from ligation of the artery, however, in the two cases in which the more extensive approach was used (figs. 3 and 4).

In discussing open reduction in these injuries, Wilson¹ states: "Open reduction of the dislocation should be performed through an anterior incision after preliminary exposure and isolation of the radial nerve." Thompson² also advocates exposure of the upper third of the radius after isolation of the radial nerve. With this method one must incise the supinator muscle in order to isolate the nerve. In this region, moreover, the nerve gives off several branches, further complicating the procedure. Also direct exposure and traction on the nerve subject it to the possibility of injury. If

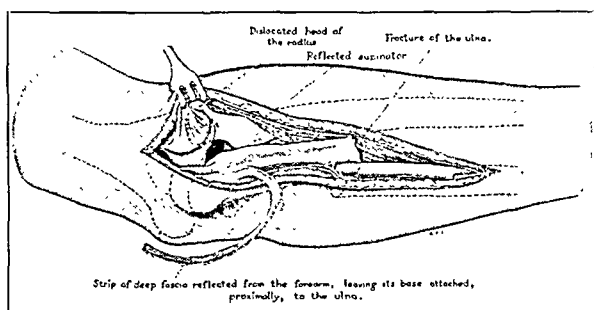


Fig. 5.—Drawing of incision described in the text. The anconeus and supinator muscles have been reflected from the ulna, revealing the head and neck of the radius. A strip of deep fascia has been elevated from the forearm and left attached proximally.

exposure of the upper third of the radius is required the method advocated herein is of particular value, since the supinator muscle can be elevated from the radius, thus providing ideal protection to the radial nerve as well as affording adequate access to the bone. This exposure has been described in detail in an article by one of us.³

After completion of the approach (fig. 5) the fracture is reduced and the position of the fragments maintained by means of a vitallium plate and screws. The head of the radius is replaced and any portion of the annular ligament which may be lodged in the radioulnar articulation is removed. A strip of deep fascia, one-half inch wide and approximately $4\frac{1}{2}$ inches long, is then elevated from the muscles of the forearm, being left attached to the proximal end of the ulna where the deep fascia blends with the periosteum at the lower end of the subcutaneous triangular space, which forms the dorsal portion of the olecranon. The fascial strip is passed between the radial notch of the ulna and the tuberosity of the radius and thence around the neck

of the radius, and is fastened to itself with interrupted silk sutures. Thus, through this single incision the fracture of the ulna can be reduced and the dislocated head of the radius replaced and held in position by a fascial loop (figs. 6, 7 and 8).

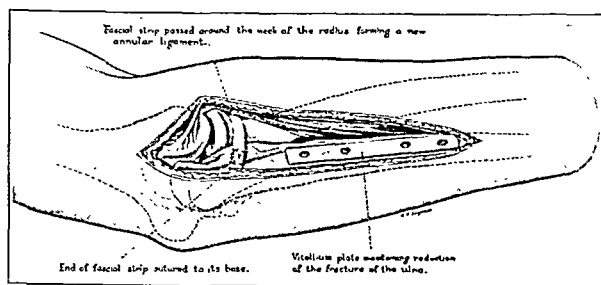


Fig. 6.—Operation completed. The fracture of the ulna has been reduced and a vitallium plate applied for fixation. The strip of fascia has been passed round the neck of the radius and sutured to itself, forming a sling for maintaining reduction of the head of the radius.

TREATMENT OF ACUTE FRACTURES IN CHILDREN

In children the fragments of the ulna can often be satisfactorily aligned and the radial head replaced in the anatomic position by manipulation. In instances of anterior dislocation of the head of the radius the extremity is immobilized with the elbow flexed and the forearm supinated. In children, as in adults, the ulnar fragment deviates toward the radius; union takes place more rapidly, however, and as the child grows the angulation of the ulna tends to straighten out. An apparently severe malunion may be spontaneously corrected to an extent which permits normal function of the elbow

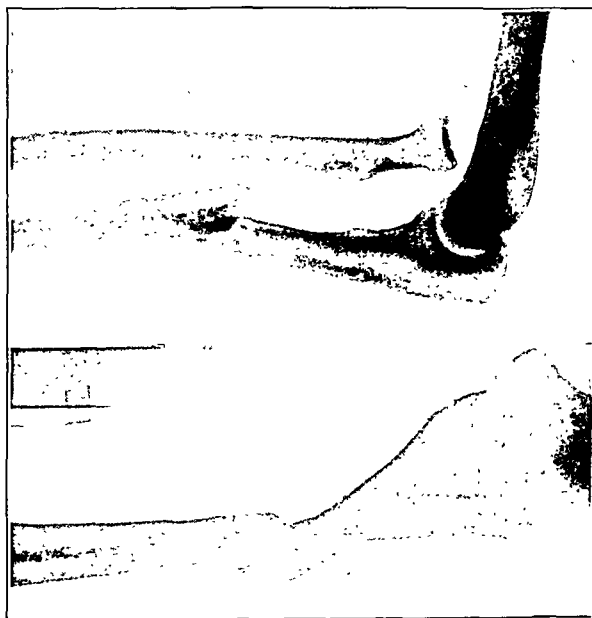


Fig. 7.—Lateral and anteroposterior views of acute fracture of the ulna with dislocation of the head of the radius in a patient aged 27.

(figs. 9, 10 and 11). Considering these beneficial growth factors, one is justified in accepting a more severe radial angulation of the ulnar fragment in children than in adults.

Maintenance of the radial head in the normal position is more important in children than anatomic alignment of the ulnar fragments. In the roentgenogram one may

1. Wilson, P. D.: Fractures and Dislocations in Region of Elbow, *Surg., Gynec. & Obst.* 56: 335 (Feb., No. 2A) 1933.
2. Thompson, J. E.: Anatomical Methods of Approach in Operations on the Long Bones of the Extremities, *Ann. Surg.* 68: 309 (Sept.) 1918.
3. Boyd, H. B.: Surgical Exposure of Ulna and Proximal Third of Radius Through One Incision, *Surg., Gynec. & Obst.* 71: 86 (July) 1940.

find the head of the radius well reduced with the elbow in flexion, only to discover later, when the elbow is extended, that the dislocation recurs. In this event, open reduction of the dislocated radial head, combined with proper fixation to prevent recurrence, should be

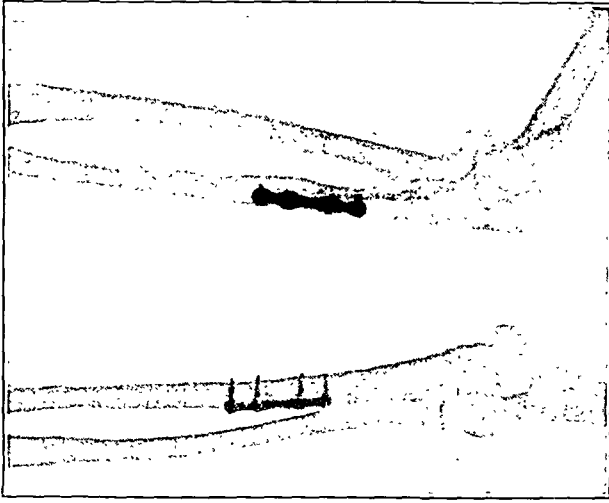


Fig. 8.—Lateral and anteroposterior views of same arm shown in figure 7. A vitallium plate was applied to the ulna and is shown, one year post-operatively, fixing the bone in excellent position in both views. The fascial loop that was placed about the neck of the radius has maintained reduction of the dislocation.

undertaken. Similarly, if one has difficulty in obtaining a reasonably anatomic alinement of the ulnar fragments, operation is advisable.

The surgical procedures described for the treatment of Monteggia fractures in adults are applicable also to those in children.

TREATMENT OF OLD MONTEGGIA FRACTURES

The disability and deformity associated with old Monteggia fractures arise from nonunion or malunion of the ulna, usually with permanent dislocation of the head of the radius. Occasionally one sees a permanent

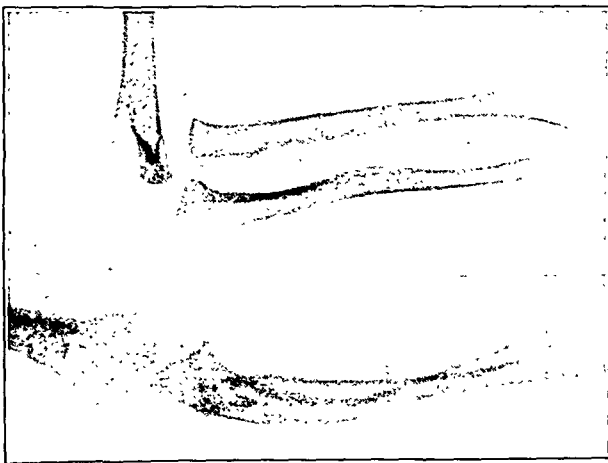


Fig. 9.—Lateral and anteroposterior views of acute fracture of the ulna with dislocation of the head of the radius in a patient aged 2½ years.

dislocation of the radius with only slight deformity of the ulna. In such cases the injury was generally sustained during childhood and the dislocation recurred or was never reduced.

Nonunion of the Ulna with Dislocation of the Radial Head.—In these old injuries the ends of the ulnar fragments are usually sclerotic, and in order to correct the

angulation and secure bone of satisfactory quality for union one must resect the end of each fragment. This shortens the ulna from one-half to three-fourths inch. The muscles and other soft tissue structures of the forearm are contracted, incident to the angulation and shortening of the ulna. Under these conditions reduction of the head of the radius would produce a gap in the ulna of from one-half to three-fourths inch, which would be incompatible with bony union. Further, the pressure on the articular surface of the head of the radius would lead to degenerative changes. The outcome of such a procedure would be, in all probability, nonunion of the ulna, extensive arthritic changes in the radiohumeral joint or recurrence of the dislocation. Experience has shown that the safest procedure is resection of the head of the radius and a sufficient portion of the neck to compensate for the loss of length in the ulna, followed by approximation and fixation of the ulnar fragments by means of a bone graft (figs. 12 and 13). As an alternative, one might remove a sufficient portion of the shaft of the radius to compensate for the shortening

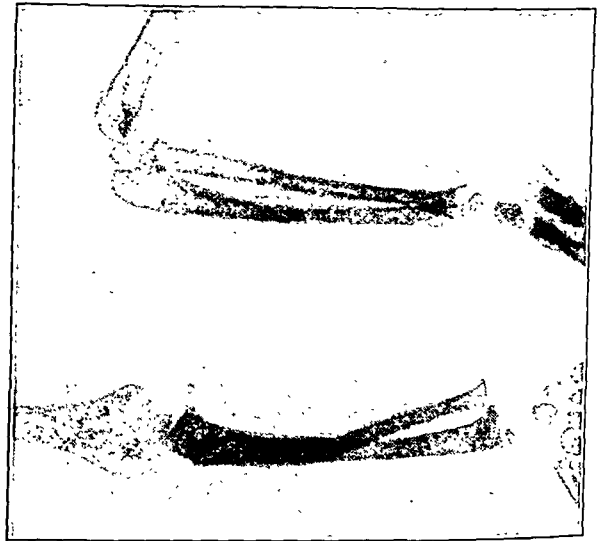


Fig. 10.—Lateral and anteroposterior views of same arm shown in figure 9 three weeks after reduction. The angulation of the ulna is still present; callus is present about the fracture site. The head of the radius remains in the corrected position.

of the ulna and apply a vitallium plate to the two fragments. There are, however, three objections to this procedure: (1) In many cases degenerative changes are present in the articular surface of the radial head which predispose traumatic arthritis in the radiohumeral joint, (2) the additional osteotomy of the radius increases the uncertainty of the outcome, and (3) the measure complicates and lengthens the operation. Moreover, the functional results probably would not be improved. This method was employed in one case of the present series in which a fracture of the radius was already present; although the fragments of the radius united, flexion and extension, as well as pronation and supination, of the elbow were severely limited from arthritic changes about the head of the radius.

Formerly, autogenous bone pegs were used for fixation of the onlay graft. In some cases, however, the pegs failed to maintain immobilization because of the strain at the fracture site produced by the radial angulation of the ulna. For this reason the pegs have been

discarded in favor of vitallium screws, which insure better fixation of the graft.

Malunion of the Ulna with Dislocation of the Head of the Radius.—Probably the safest method of treating malunion of the ulna with dislocation of the radial head is by osteotomy of the ulna at the point of maximum angulation and fixation of the fragments by means of a bone graft, as for the treatment of nonunion of the ulna. This conclusion is based on the fact that, first, union frequently fails to take place in the ulna and, further, that union following osteotomy is more likely if a bone graft, rather than a plate, is applied. In some cases, however, the fragments have united following osteotomy and the application of a vitallium plate. Fixation by either a bone graft or a plate is necessary in every case, since only by this means can recurrence of the deformity be prevented. If the deformity is of long standing or if the ulna is shortened, the head of the radius should be removed.

Permanent Dislocation of the Head of the Radius Without Deformity of the Ulna.—All our patients with this condition had sustained the injury during childhood and the head of the radius had not been reduced, or

of the ulna. On the other hand, the operative management herein advocated has effectually prevented angulation of the ulna and maintained reduction of the radial head; as a consequence the results have been gratifying from both an anatomic and a functional point of view.

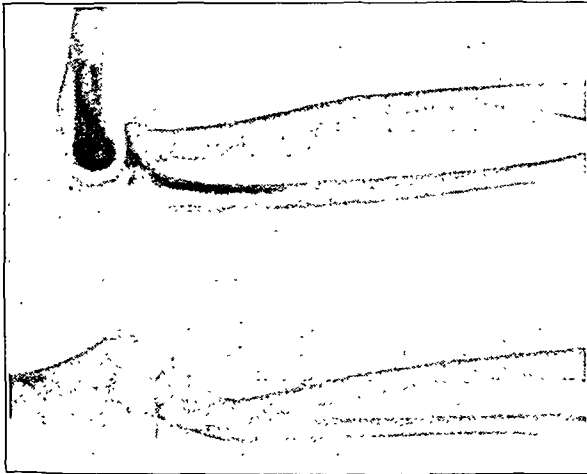


Fig. 11.—Lateral and anteroposterior views of same arm shown in figures 9 and 10 twelve years after reduction. The contour and function of the elbow are normal; the ulnar angulation has been spontaneously corrected with growth.

the dislocation had recurred. Although these patients have been too well satisfied with the functional results to desire treatment, it is conceivable that arthritic changes about the head of the radius or calcium deposits in the soft tissue might necessitate excision of the radial head during adult life.

END RESULTS

In adults, treatment of fractures of the upper one half of the ulna, 2 inches or more below the tip of the olecranon, by either closed reduction or open reduction and wiring of the fragments has resulted in radial angulation of the proximal fragment. Subluxation of the radial head has followed moderate angulation of the ulna, and complete dislocation has recurred from severe angulation. Some of these patients have obtained almost perfect function in the elbow; the majority, however, have limited motion, particularly on supination and pronation of the forearm. The impairment of rotation has varied from a negligible degree to practically total restriction, depending on the severity of the deformity



Fig. 12.—Lateral and anteroposterior views of ununited fracture of the ulna with dislocation of the head of the radius of twelve years' duration. The patient had previously had an open reduction and a resection of the head of the radius elsewhere.

In children, closed reduction has been more successful; in some cases, normal function of the elbow without deformity has been restored. In others, however, the dislocation of the head of the radius has recurred. The end results have been excellent following operative procedures similar to those advocated for adults. These procedures are recommended if there is any question as to accurate reduction of the head of

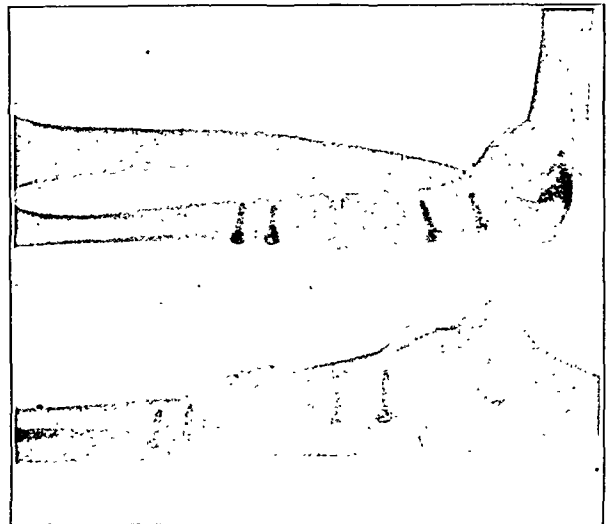


Fig. 13.—Lateral and anteroposterior views of same arm shown in figure 12 six months after the application of an onlay bone graft secured with vitallium screws, and further resection of the upper end of the radius. The ulna is clinically united and the patient is performing manual labor. Flexion of the elbow ranges from 45 to 170 degrees; motion is gradually increasing.

the radius or any tendency toward recurrence of the dislocation.

In the presence of nonunion of the ulna with dislocation of the radial head, good results have been obtained by the use of the onlay bone graft and fixation

by vitallium screws combined with resection of the head of the radius.

Treatment of malunited fractures of the ulna with dislocation of the head of the radius by osteotomy of the ulna and fixation with wire loops or other sutures has been disappointing, whereas the results of osteotomy and fixation of the fragments with a bone graft secured by vitallium screws have been most encouraging. The outcome has also been successful following the application of a vitallium plate. In these old cases, however, union of the ulna following the use of the vitallium plate has been distinctly slower than that following the insertion of a bone graft; in view of this fact and the possibility of nonunion in the ulna, the use of a bone graft is preferable to that of a plate.

Normal flexion and extension, as well as pronation and supination of the elbow, have been seen in patients with permanent dislocation of the head of the radius without deformity of the ulna as long as eleven years after the injury. Although motion is normal, the end results in these elbows are not considered excellent, since there is usually an increase in the carrying angle, muscle atrophy, weakness of the extremity, arthritic changes about the head of the radius, or a combination of these factors. One patient with a permanent dislocation of the radius had mild arthritic changes between the head of the radius and the humerus. On flexion of the elbow the radial head could be felt slipping over the lateral condylar ridge of the humerus, and crepitus was elicited when the forearm was pronated or supinated with the elbow flexed to 90 degrees. As this patient grows older the arthritic changes and symptoms may become sufficiently severe to justify removal of the head of the radius.

We have resected the head of the radius of fifteen patients. These patients have been followed over a period of years. Only three have developed any abnormality in the lower radio-ulnar articulation. These three have approximately one-half inch of radial shortening at the level of the radial styloid, the lower end of the ulna is correspondingly prominent and the hand is slightly deviated toward the radius. Two of the patients have no symptoms and the other has only mild pain in the wrist after unusual activity. Although there are theoretical objections to resection of the head of the radius, practically the procedure has not been of any material consequence.

CONCLUSIONS

1. The treatment of acute fractures of the ulna with dislocation of the head of the radius in adults is usually unsatisfactory by closed methods.

2. Open reduction with internal fixation of the fragments of the ulna by means of a vitallium plate and replacement of the radial head followed by the passage of a fascial loop around the neck of the radius to prevent recurrence of the dislocation is the procedure of choice.

3. Closed reduction of acute fractures of the ulna with dislocation of the head of the radius may often be employed in children; this, however, is frequently a hazardous procedure, as accurate replacement of the radial head is difficult and the dislocation is prone to recur.

4. For nonunion or malunion of the ulna with dislocation of the head of the radius, resection of the head and neck of the radius combined with an onlay bone graft of the ulna secured by vitallium screws is recommended.

5. Disturbances of the lower radio-ulnar articulation have not been of sufficient practical importance to contraindicate resection of the head and neck of the radius.

6. The operative technic in these fractures is simplified and danger of injury to the radial nerve is eliminated by use of the anatomic approach described.

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ABSTRACT OF DISCUSSION

DR. B. FRANKLIN BUZZY, Camden, N. J.: The authors' experience differs from mine in their frequency of open reductions of the dislocated radial head. I have always felt that in the care of this lesion, if the radial dislocation can be reduced, the ulna must of necessity be reduced, and the only disturbing element to be guarded against is the radial angulation of the ulnar fracture, which if present must be openly reduced and fixed. The ingenious incision advocated by the authors is well worth consideration since it does expose both lesions without endangering the radial nerve, and the use of forearm fascia is definitely an improvement over the second incision in the thigh for fascia lata. A case illustrating some of the late bad results of this lesion, treated conservatively in the beginning, shows a divergent dislocation of both bones at the elbow, with a fracture of the ulna at its middle. The dislocation was easily reduced and held in flexion. Nonunion of the fracture ensued, which required late plating with vitallium screws and plate. As time passed there developed a great mass of bony overgrowth involving all three bones at the elbow, accompanied by no rotation and by only 30 degrees of flexion and extension, from 90 to 120 degrees. Lack of motion, while complained of bitterly, was not the indication for an excision of this elbow, which was done. Pain was the patient's chief complaint, and as can be seen by x-ray examination before the excision was done the removal of the head of the radius alone would not have given a satisfactory end result. However, excision of the head of the radius is a worth-while procedure in late cases especially, when there has been an overgrowth in length of the radius due to the unreduced lesion in childhood. Although lateral and posterior dislocation are occasionally seen in these late cases, my experience has been that they are dislocated for the most part anteriorly and cause a definite bony block to flexion by impinging on the anterior surface of the humerus. When the head is removed, the radius seems to fall into its proper position and, in spite of action of the biceps, stays there. In adults I have never found any disturbance of the lower radio-ulnar articulation after the excision of the head of the radius. Excision of the head of the radius in childhood, however, is a totally different matter and if at all possible should never be done before growth has ceased. When it is done, it is commonly followed in adult life by cubitus valgus, with secondary ulnar neuritis from stretching of the nerve in its normal groove. This of course can be relieved only by the transplantation of the nerve anterior to the internal condyle.

DR. HERMAN F. JOHNSON, Omaha: I wish to emphasize several points. It is frequently desirable to have x-ray examination of both elbows for comparative study, as a slight anterior position of the head of the radius is not easily recognized when examining the single joint. The necessity of open reduction and very rigid fixation of the shaft of the ulna to prevent the tendency to radial deviation is of prime importance. The approach as described by the authors has been worked out along anatomic lines and simplifies the operative procedure. This again brings out the desirability of the posterior approach to the elbow when extensive reconstructive procedures are necessary. Restoration of the annular ligament by the attached strip of deep fascia obtained from the upper forearm apparently is of adequate strength to maintain reduction of the head of the radius. I am rather reluctant to use Lane plates with multiple penetration of the cortex by screws, especially in compound fractures. However, with the use of the electrically neutral alloy vitallium the method is apparently a safe one. In my hands the use of long, slender steel pins, somewhat smaller than the Steinman pin,

passed down from the point of the olecranon process through the shaft of the ulna has proved to be the most satisfactory type of fixation. This pin is inserted through a short independent incision and is particularly desirable if the shaft of the ulna is comminuted. The base of the pin protrudes just enough so it can be grasped and thus easily removed when it has served its purpose. Drs. Speed and Boyd are to be commended on the excellent work they have done in this series of cases and the completed movie shown at their exhibit illustrates the approach very nicely and also shows some beautiful end results.

DR. G. MOSSER TAYLOR, Los Angeles: In reviewing the literature on this fracture, as the authors have said, the bulk of it is in foreign languages. The argument seems to be between two groups, one that emphasizes the necessity for securing the full length of the ulna, and the other group, which says that, if the radius is reduced, the ulna will fall into the proper alignment. The American writers seem to emphasize more the importance of open reduction for those cases in which the head of the radius is difficult to maintain in position. I want to present what I think will help us in relation to the paper that Drs. Speed and Boyd have given. In a closed reduction with the head of the radius not reduced as yet I used a beaded wire which held the head of the radius in place and lost a little position in the ulna, owing probably to a failure in technic. I don't think that I needed to have lost that. In the end result there is still angulation toward the radial side of the ulna. Two years later the doctor, now 45 years of age, has practically normal flexion and extension. He lacks a little in full extension, but rotation is lost about 50 per cent. The way in which I had to get most of this rotation was by manipulation. It took about five anesthetics and manipulation to force that rotation. Whether that is due to the adhesions about the head of the radius owing to the fact that the invaginated orbicular ligament was still held in its displaced position and the lesions following it had to be broken up, or whether that loss of rotation was due to adaptive shortening of musculature is a question. I believe that if this procedure of Dr. Speed and Dr. Boyd had been emphasized at the time this patient came in the man would now have a better range of motion.

DR. J. ALBERT KEY, St. Louis: This is a beautiful incision which makes the operation look a good deal easier than it is—at least than it has been in my hands in the few cases that I have done. Consequently I think it should be avoided when one is not competent to do this type of surgery. I believe that many of these cases can be reduced by the closed method and that the radial deviation of the ulna can be prevented by two wood splints incorporated in the plaster cast. These splints are padded. A long posterior and a short anterior splint are used. These are slightly wider than the forearm. They are put on the forearm and are pressed together so that they press the muscles between the bones and are strapped on with adhesive tape but not tightly enough to interfere with the circulation. The extremity is then encased in a plaster cast. Where competent surgery is available I think that a thorough débridement followed by implantation of sulfanilamide in the wound will permit the use of internal fixation with stainless steel or vitallium. The argument is still open as to whether or not vitallium has any advantage over stainless steel. I believe that the extra fixation given by the internal fixation plus the sulfanilamide is more of a preventive against infection than is the foreign body a detrimental factor.

DR. HAROLD B. BOYD, Memphis, Tenn.: We have successfully used a pin, as described by Dr. Johnson, in two cases of compound fracture of the ulna; however, we do not consider this to be ideal treatment for Monteggia fractures. I should like to emphasize further the angulation of the ulna toward the radius in these fractures. If the fracture is at its usual location (junction of the upper and middle thirds of the ulna), the pull of the supinator is enormous and the angulation, in our experience, cannot be prevented by external fixation. As much as I admire Dr. Key, I must say that I do not believe board splints are adequate to prevent the angulation which occurs in these fractures.

CANCER OF THE SKIN IN RELATION TO MULTIPLE MALIGNANT GROWTHS

SHIELDS WARREN, M.D.

AND

OLIVE GATES, M.D.

BOSTON

Since the proposal has been made that the production of curable cancer of the skin by irritations which are not carcinogenic to internal organs may save some lives by preventing cancer of the internal organs, it becomes important to examine the data on which this proposal rests. On the basis of their figures, Peller and Stephenson¹ assume that cancer of the skin and lip exerts a beneficial effect in preventing the development of cancer elsewhere. So startling a suggestion as this deserves careful analysis. They show that in a total of 875,000 person-years of observation of United States Navy personnel there were ninety-one cases of cancer of the skin and lip with eleven deaths in a total of 113 cancer deaths.² Of these person-years of observation, over half (496,830) represented subjects below 30 years of age and hence not particularly useful for a study of cancer incidence. They contrast these figures with the cancer mortality calculated for similar age groups in the United States registration area for the period from 1928 to 1932 and for New York City for 1920. As is shown by their table, the figures are essentially the same for the navy personnel and for the United States registration area.³ This fact they discard and contrast navy figures with those of New York City for 1920. They find 44 per cent fewer deaths among the navy personnel than would have been expected on the basis of New York City statistics for white men of corresponding age groups.

Previously Peller³ had claimed, from calculations based on the occupational mortality statistics of England and Wales for the years 1921-1923, that an increase of carcinogenic irritation leads to an increase of cancer at the irritated spot but that this increase does not lead to an increase of total cancer mortality, causing rather a decrease because of a lessened incidence of cancer in more inaccessible organs.

In a careful survey Conrad and Hill,⁴ using the basic data, showed that there was no inverse association between mortality from cancer of the skin and lip and mortality from cancer in other sites but that those occupations having a higher rate of skin and lip cancer have also an excess of cancer at other sites. This would fit in with our observation⁵ that the person who has one cancer is definitely more likely to have a second cancer than would be expected on the basis of chance alone. In a recent study of multiple malignant tumors by Stalker and others⁶ 167 cases were encountered in

Dr. S. O. Hoerr and S. L. Rea assisted in this study.

Read in part before the American Association for Cancer Research, March 19, 1940.

From the Department of Pathology, Harvard Medical School, and the Laboratories of Pathology, Huntington Memorial Hospital, New England Deaconess Hospital and Pondville State Hospital for Cancer.

1. Peller, Sigismund, and Stephenson, C. S.: *Am. J. Hyg.* (section A) **29**: 34 (Jan.) 1939; *Am. J. M. Sc.* (footnote 2).

2. Peller, Sigismund, and Stephenson, C. S.: *Am. J. M. Sc.* **194**: 326 (Sept.) 1937.

3. Peller, Sigismund: *Lancet* **2**: 552 (Sept. 5) 1936.

4. Conrad, K. K., and Hill, A. B.: *Am. J. Cancer* **36**: 83 (May) 1939.

5. Warren, Shields, and Gates, Olive: *Am. J. Cancer* **16**: 1358 (Nov.) 1932.

6. Stalker, L. K.; Phillips, R. B., and Pemberton, J. de J.: *Surg., Gynec. & Obst.* **68**: 595 (March) 1939.

which there was involvement of the skin or lip, and among these fourteen cases, or 8.4 per cent, showed malignant disease of other organs.

In order to present further data on this point we have surveyed the incidence of multiple malignant tumors in cases of cancer of the skin studied at the Huntington Hospital, Massachusetts State Tumor Diag-

nosis Service and the Pondville State Hospital for Cancer.⁷ These cover 1,149 persons with basal cell or epidermoid carcinoma of the skin, followed for an

7. We have not included cases of cancer of the lip in our cutaneous cancer population because the difficulty of treatment of this lesion and its mortality are so much greater than those of cancer of the skin as to make any suggestion of induction of cancer of the lip for prophylactic purposes completely ridiculous.

TABLE 1.—Age and Sex Distribution of Cutaneous Cancer Population According to Type of Cancer

Classification of Data and Age Group	Men			Women			Total		
	Basal	Epidermoid	Total	Basal	Epidermoid	Total	Basal	Epidermoid	Total
20-29 years									
Number of cases.....	1	3	4	5	1	6	6	4	10
Average duration.....	8.5	0.5	2.5	3.7	8.5	4.5	4.5	2.5	3.7
Number of risk years.....	8.5	1.5	10.0	18.5	8.5	27.0	27.0	10.0	37.0
30-39 years									
Number of cases.....	17	6	23	16	2	18	33	10	43
Average duration.....	6.7	2.5	5.3	5.25	9.0	5.7	6.0	3.6	5.4
Number of risk years.....	113.5	18.0	131.5	84.0	18.0	102.0	197.5	36.0	233.5
40-49 years									
Number of cases.....	43	23	66	30	7	37	73	30	103
Average duration.....	7.7	6.5	7.3	7.5	8.6	7.7	7.6	7.0	7.4
Number of risk years.....	329.5	149.5	479.0	225.0	60.5	285.5	554.5	210.0	764.5
50-59 years									
Number of cases.....	100	44	144	59	26	85	159	70	229
Average duration.....	6.1	5.4	5.9	6.7	5.5	6.4	6.3	5.4	6.1
Number of risk years.....	610.0	236.0	846.0	398.5	142.0	540.5	1,008.5	378.0	1,386.5
60-69 years									
Number of cases.....	141	107	248	70	34	104	211	141	352
Average duration.....	5.8	4.7	5.3	5.7	4.9	5.5	5.8	4.8	5.4
Number of risk years.....	817.0	504.5	1,321.5	401.0	167.0	568.0	1,218.0	671.5	1,889.5
70-79 years									
Number of cases.....	94	117	211	56	42	98	150	159	309
Average duration.....	4.5	3.9	4.2	5.2	3.4	4.4	4.8	3.8	4.3
Number of risk years.....	426.0	453.5	879.5	292.0	143.0	435.0	718.0	596.5	1,314.5
80+ years									
Number of cases.....	32	37	69	11	20	31	43	57	100
Average duration.....	3.2	3.2	3.2	2.4	3.1	2.9	3.0	3.2	3.1
Number of risk years.....	102.0	118.5	220.5	26.5	62.0	88.5	129.5	180.5	310.0
Total									
Number of cases.....	420	339	768	248	133	381	677	472	1,149
Average duration.....	5.7	4.4	5.1	5.8	4.5	5.4	5.7	4.4	5.2
Number of risk years.....	2,424.0	1,481.5	3,905.5	1,440.0	601.5	2,040.5	3,873.0	2,083.0	5,956.0

TABLE 2.—Occurrence of Multiple Cancers (Cutaneous and Internal) in Cutaneous Cancer Population

Classification of Data and Age Group	Men			Women			Total		
	Basal	Epidermoid	Total	Basal	Epidermoid	Total	Basal	Epidermoid	Total
20-29 years									
Number of cases.....	0	0	0	0	0	0	0	0	0
Average duration.....	0	0	0	0	0	0	0	0	0
Number of risk years.....	0	0	0	0	0	0	0	0	0
30-39 years									
Number of cases.....	2	0	2	2	0	2	4	0	4
Average duration.....	1.5	0	1.5	2.5	0	2.5	2.0	0	2.0
Number of risk years.....	3.0	0	3.0	5.0	0	5.0	8.0	0	8.0
40-49 years									
Number of cases.....	2	5	7	4	0	4	6	5	11
Average duration.....	5.5	3.9	4.4	12.0	0	12.0	9.8	3.9	7.1
Number of risk years.....	11.0	19.5	30.5	48.0	0	48.0	59.0	19.5	78.5
50-59 years									
Number of cases.....	16	12	28	10	8	18	26	20	46
Average duration.....	5.8	4.6	5.3	7.8	7.0	7.4	6.6	5.5	6.1
Number of risk years.....	93.0	55.0	148.0	78.0	56.0	134.0	171.0	111.0	282.0
60-69 years									
Number of cases.....	32	33	65	13	5	18	45	38	83
Average duration.....	5.3	5.5	5.4	4.6	9.7	6.0	5.1	6.1	5.9
Number of risk years.....	169.0	181.5	350.5	59.5	48.5	108.0	228.5	230.0	458.5
70-79 years									
Number of cases.....	17	28	45	14	14	28	31	42	73
Average duration.....	2.6	3.8	3.3	4.6	2.4	3.5	3.5	3.3	3.5
Number of risk years.....	43.5	106.0	149.5	65.0	33.0	98.0	108.5	139.0	247.5
80+ years									
Number of cases.....	7	10	17	2	1	3	9	11	20
Average duration.....	2.5	3.1	2.9	0.5	0	2.2	2.1	3.3	2.8
Number of risk years.....	17.5	31.0	48.5	1.0	5.5	6.5	18.5	36.5	55.0
Total									
Number of cases.....	76	88	164	45	28	73	121	116	237
Average duration.....	4.4	4.5	4.5	5.7	5.1	5.5	4.9	4.6	4.8
Number of risk years.....	337.0	393.0	730.0	256.5	143.0	399.5	593.5	536.0	1,129.5

average period of 5.2 years or a total of 5,956 risk years, during which other cancers might have developed. By utilizing a cutaneous cancer population of this size we feel that errors due to chance have been more nearly eliminated than in the population utilized by Peller and Stephenson. We have not concerned ourselves with the incidence of cutaneous cancer in the total population, as our interest has been in weighing the validity of the suggestion made by them in 1939 that "the very low frequency of cancer of inner organs

for the Massachusetts 1930 population as against an attack or morbidity rate of 1.29 ± 0.146 for our group of cases of cutaneous cancer. If we accept for the Massachusetts population a cancer attack rate of twice the cancer mortality rate, as has been suggested by Warren,⁹ that gives a rate of 0.28 per hundred risk years (table 4) as contrasted with one of 1.29.

In every age group the observed number of cases exceeded the calculated number (table 3). In other words, the cancer attack rate for organs other than the

TABLE 3.—Occurrence of Cancer Other than Cutaneous Observed and Expected in Cutaneous Cancer Population

Classification of Data and Age Group	Men			Women			Total		
	Basal	Epidermoid	Total	Basal	Epidermoid	Total	Basal	Epidermoid	Total
20-29 years									
Observed.....	0	0	0	0	0	0	0	0	0
Expected.....	0	0	0	0	0	0	0	0	0
30-39 years									
Observed.....	0	0	0	2	0	2	2	0	2
Expected.....	0.02	0	0.02	0.04	0.01	0.05	0.06	0.01	0.07
40-49 years									
Observed.....	1	1	2	1	0	1	2	1	3
Expected.....	0.25	0.11	0.36	0.35	0.095	0.445	0.60	0.21	0.81
50-59 years									
Observed.....	4	6	10	5	3	8	9	9	18
Expected.....	1.53	0.59	2.12	1.47	0.5	1.97	3.0	1.09	4.09
60-69 years									
Observed.....	8	11	19	6	2	8	14	13	27
Expected.....	5.08	3.11	8.19	2.50	1.06	3.56	7.58	4.17	11.75
70-79 years									
Observed.....	5	5	10	6	6	12	11	11	22
Expected.....	4.73	5.04	9.77	3.08	1.51	4.59	7.81	6.55	14.36
80+ years									
Observed.....	0	4	4	0	1	1	0	5	5
Expected.....	1.54	1.77	3.31	0.36	0.85	1.21	1.90	2.62	4.52
Total									
Observed.....	18	27	45	20	12	32	38	39	77
Expected.....	13.15	10.62	23.77	7.81	4.03	11.84	20.96	14.65	35.61

is explained as the result of the above mentioned increased skin irritation and Peller's concept of its role."¹

The age distribution of the 1,149 cases by sex and type of cancer is shown in table 1. Of this group of patients with cancer of the skin, 237 developed addi-

skin in a population made up of patients with cancer of the skin is over twice as great as would be expected instead of showing, as suggested by Peller and Stephenson, a definitely lowered rate for cancer of the other organs.

SUMMARY AND CONCLUSIONS

On the basis of 1,149 carefully studied cases of cancer of the skin, we conclude that there is no justification for recommending the induction of cancer of the skin to protect against development of cancer elsewhere. In this population with cutaneous cancer there is definitely more cancer of organs exclusive of the skin than would be encountered in a similar population drawn from Massachusetts at large. Cancer of the skin does not

TABLE 4.—Cancer Attack Rate for Cutaneous Cancer Population per Hundred Risk Years

Age Group	Massachusetts 1930 Cancer Death Rate per 100			Estimated Cancer Attack Rate per 100 Risk Years		
	Men	Women	Total	Men	Women	Total
20-29 years.....	0.01	0.01	0.02	0.02	0.02	0.04
30-39 years.....	0.02	0.05	0.03	0.04	0.10	0.06
40-49 years.....	0.03	0.16	0.12	0.16	0.32	0.24
50-59 years.....	0.25	0.35	0.30	0.50	0.70	0.60
60-69 years.....	0.62	0.64	0.63	1.24	1.28	1.26
70-79 years.....	1.11	1.06	1.08	2.22	2.12	2.16
80+ years.....	1.40	1.37	1.42	2.98	2.74	2.84
Total.....	0.12	0.16	0.14	0.24	0.32	0.28

tional cancers (of skin and internal organs) during the period that they were followed. One hundred and sixty-four subjects were men and seventy-three women (table 2). This incidence of multiple cancer represents 20.6 per cent of the cases. However, the tendency of cancer of the skin to be multiple has long been known and should excite no surprise.⁸ When, however, we examine the figures for cancer of other organs than the skin associated with these cutaneous cancers, we find a total of seventy-seven, or 6.7 per cent (table 3). In every age group the cancer attack rate for organs other than skin exceeded materially that of the Massachusetts 1930 cancer death rate, being 0.14 per hundred risk years

TABLE 5.—Cancer Attack Rate for Cutaneous Cancer Population per Hundred Risk Years

Subjects	30-39 Years	40-49 Years	50-59 Years	60-69 Years	70-79 Years	80+ Years	Total
All Cancers							
Men.....	1.52	1.46	3.31	4.92	5.12	7.68	4.20
Women.....	1.96	1.39	3.33	3.17	6.45	3.39	3.56
Total.....	1.88	1.44	3.32	4.40	5.55	6.45	3.98
Not Skin Cancers							
Men.....	0.00	0.42	1.18	1.44	1.14	1.80	1.15
Women.....	1.96	0.35	1.48	1.41	2.76	1.15	1.56
Total.....	0.94	0.39	1.50	1.43	1.78	1.61	1.29
	± 0.616	± 0.285	± 0.304	± 0.275	± 0.365	± 0.715	± 0.146

protect against the development of cancer elsewhere. With this type of cancer as with cancer of the other organs, there is a greater number of multiple cancers than would be expected on the basis of chance.

195 Pilgrim Road.

8. Owen, L. J.: Multiple Malignant Neoplasms, J. A. M. A. 76: 1329 (May 14) 1921.

9. Warren, Shields: Surg., Gynec. & Obst., to be published.

INTRAMEDULLARY (STERNAL) TRANSFUSION OF HUMAN BONE MARROW

PRELIMINARY REPORT

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The unequivocal progress in the treatment of the deficiency anemias within recent years has also extended to the blood dyscrasias. The concept and subsequent proof of the absence of the intrinsic factor and consequent disturbance of the erythrocytic maturing factor substance has led to the successful treatment of pernicious anemia and other hyperchromic anemias. Iron therapy has yielded similar results in the hypochromic anemias. Certain anemias secondary to vitamin and endocrine disturbances have also yielded to therapy on the basis of the deficiency element. Supplying a specific deficiency seems to be the order of the day in the treatment of certain of the aforementioned anemias. A similar rationale might underlie the treatment of other blood dyscrasias. Such disorders as aplastic anemia, granulocytopenia, leukemia and thrombocytopenic purpura might well come under this category. If we assume that it takes erythrocyte maturing factor substance to cause the orderly conversion of the megaloblast into a normal red cell and so successfully treat pernicious anemia, the question arises why it is not possible to treat aplastic anemia or myelogenous leukemia by providing the patient with a similar "deficiency substance." In aplastic anemia the hematocytoblast would then function normally and give rise to a normal quota of megaloblasts, myeloblasts and megakaryocytes associated with normal maturative and delivery processes. In leukemia this unknown deficiency substance could afford the normal conversion of the myeloblast into a polymorphonuclear leukocyte.¹ In granulocytopenia the myeloblasts may be stimulated to function properly.

The next question that arises is that, if indeed there is such a factor, where does it reside? And if we know its residence, where in the patient would it do the most good? It was assumed that these substances would probably be found in the bone marrow and that they would exert their most direct benefit if they were introduced into the marrow. Experience with other deficiency dyscrasias has shown that there could be deficient absorption or utilization of the principle if given either subcutaneously or intravenously.

A new approach via bone marrow transfusion may be utilized in many ways. Where formerly liver extract, pentnucleotides,^{1a} nucleic acid² and "leukogens"³ were given subcutaneously or intravenously,

these and other substances can now be injected into the sternal marrow.⁴ Yellow bone marrow extract,⁵ given by mouth, has not achieved uniformly good results. Such substances as vitamins or iron and other medications may now be given by the intramedullary route in cases refractory to the same substances given in the usual way. Thus it may be possible to hold the key to the solution of certain blood dyscrasias as well as the more refractory of the anemias⁶ or leukopenias.

It is interesting to record the method of bone marrow transfusion and recovery in a case of idiopathic aplastic anemia:

REPORT OF CASE

B. B., a white man aged 42, Jewish, a salesman of knitted goods, was admitted to the private service of Dr. Governale at the Long Beach Hospital on April 22, 1940, complaining of bleeding from the gums for the past seven days, painful swelling of the right lower jaw of three days' duration, and a general feeling of weakness and malaise for the past two weeks.

Since bleeding from the gums became more severe and nosebleeds of unusual severity occurred, and since the swelling of the right side of the face spread to such an extent that the patient was unable to open his mouth to partake of food, it was decided to admit him to the hospital.

The past history was negative except for the usual childhood diseases. Careful inquiry into the past revealed no history of any complaints requiring the use of any drugs (especially acetylsalicylic acid, aminopyrine, arsenic, arsphenamine or sulfanilamide and its derivatives), no exposure to x-rays or radium or the use of radioactive elements.

On admission the patient was pale and obese, and his temperature was 102.4 F. There was marked swelling of the right cheek involving especially the right lower jaw. The nostrils contained dry clotted blood. The mouth showed fresh and coagulated blood on the gums of the right cheek, associated with some tenderness in the region of the last molar. At this point there was some bleeding and black discoloration with evidences of an ulcerative and necrotic lesion. The soft palate and right anterior pillar also were involved by this lesion and patches of white exudate were seen nearby. Also the uvula and the base of the tongue were involved in this necrotic

4. Articles on substances that can be injected into the sternal marrow: Tosatti, E.: Provocation of Myelohematic Lesions and Sterility in the Rabbit by Intramedullary Injections of Tar, *Sang* 10:388-392, 1936.

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5. Marberg, C. M., and Wiles, H. O.: Yellow Bone Marrow Extracts in Granulocytopenia: Preliminary Report, *J. A. M. A.* 109:1965 (Dec. 11) 1937. Marberg, C. M., and Wiles, H. O.: Granulocytopenic Fraction of Yellow Bone Marrow, *Arch. Int. Med.* 61:408 (March) 1938.

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6. Minot, G. R., in discussion on Rhoads, C. P., and Barker, W. H.: Refractory Anemia: Analysis of One Hundred Cases, *J. A. M. A.* 110:794 (March 12) 1938.

From the Division of Hematology of the Departments of Medicine and Laboratories of the Jewish Hospital of Brooklyn.

1. Definite maturative improvement from myeloblast to myelocyte was noted in a case of acute leukemia; also diminishing left shift of the white blood cells was noted in a case of chronic myelogenous leukemia.

1a. Jackson, Henry, Jr., and Parker, Frederic, Jr.: Agranulocytosis: Etiology and Treatment, *New England J. Med.* 212:137-148 (Jan. 24) 1935.

2. Ames, Delano, and Huntley, A. A.: The Nature of Leukocytosis Produced by Nucleic Acid, *J. A. M. A.* 29:472 (Sept. 4) 1897. Doan, C. A.; Zerfas, L. G.; Warren, S., and Ames, O.: A Study of the Mechanism of Nucleate in Induced Leukopenic and Leukocytic States, with Special Reference to the Relative Roles of Liver, Spleen and Bone Marrow, *J. Exper. Med.* 47:403-435 (March) 1928.

3. Nettleship, Anderson: Leukogenic Bone Marrow and Leukocyte Extracts, *Am. J. Clin. Path.* 10:265 (April) 1940.

lesion. The posterior wall of the pharynx was not visualized because of the marked limitation of the movements of the jaw. Cervical nodes were not palpable. The heart and lungs were negative to percussion and auscultation. The liver and spleen were not palpable; the reflexes were normal. A roentgenogram of the lower jaw failed to reveal any abnormality of the right mandible. Possibilities considered on admission were subperiosteal abscess with perimaxillary phlegmon, osteomyelitis and granulocytopenia. The laboratory examination on admission revealed a hemoglobin of 58 per cent, red blood cell count of 2.64 million, white blood count of 2,300, and a differential which revealed polymorphonuclears 15 per cent, staff forms 5 per cent, lymphocytes 78 per cent, eosinophils 1 per cent, metamyelocytes 1 per cent, platelets diminished to absent, bleeding time six and one-half minutes and a coagulation time of two minutes. Urinalysis was entirely negative.

A transfusion of 500 cc. of compatible group A whole blood was given by the direct (syringe valve) method with no immediate reaction. However, there was a delayed one with a chill and rise in temperature to 104 F. The next day (April 23) there were no significant changes in the peripheral blood, but the urinalysis showed a trace of albumin and the presence of many red and white blood cells. Physical examination a few

is absent in the marrow of the patient; i.e., to overcome a deficiency. The purpose of this procedure was to stimulate erythropoiesis, leukopoiesis and thrombocytopoiesis and thus overcome the panmyelophthisis in this case.

Accordingly a bone marrow aspiration was performed on the patient, and the needle with the solid obturator in it was left in situ. Then bone marrow was aspirated from the patient's brother (group O) and 3 cc. of bone marrow was withdrawn and immediately injected into the patient's sternal marrow. The next day (April 26) another transfusion of 5 cc. of bone marrow from the same donor was done. Previous therapy, including pentnucleotide, and liver extract intramuscularly, was discontinued and only small transfusions of 150 cc. of compatible citrated blood by the gravity method were given for a few days. Sulfanilamide was given for twenty-four hours in an attempt to stem the infective agent which might be the cause. This was discontinued because of the fear of further granulocytopenia. On April 27 another bone marrow transfusion of 5 cc. from another donor was performed.

Subsequently definite hematologic improvement was noted in the following order: The platelets appeared first (from one to two days later) and were easily found on all smears (originally diminished or absent on all smears). At the same time

Transfusions and Results of Blood Examinations

Date	Transfusions		Hemo- globin, per Cent	Red Blood Cells, Million	White Blood Cells	Myelo- cytes	Meta- myelo- cytes	Staffs	Poly- morpho- nuclears	Eosino- phils	Baso- phils	Mono- cytes	Lympho- cytes	Platelets
	Blood	Bone Marrow												
4/22	500 cc.	.....	58	2.64	2,300	..	1	5	15	1	..	..	78	Diminished
4/23	500 cc.	.....	50	2.55	2,800	1	..	10	32	..	2	..	55	None
4/24	.....	.....	39	2.25	750	..	..	2	16	..	..	..	82	None
4/25	150 cc.	3 cc.	44.9	2.39	1,050	1	..	..	21	..	3	..	75	None
4/26	150 cc.	5 cc.	46.8	2.7	950	1	(10 cells seen)	2	..	..	1	1	4	None
4/27	100 cc.	5 cc.	35	2.45	850	..	(10 cells seen)	1	4	1	..	..	4	None
2/28	100 cc.	.....	34.5	2.52	1,400	1	(60 cells seen)	8	24	2	2	..	13	None
4/29	100 cc.	.....	35	2.54	2,400	..	..	2	22	4	4	..	68	Few
4/30	100 cc.	.....	36	2.42	2,600	..	2	4	38	..	2	..	54	Diminished
5/1	.....	.....	40.3	2.82	2,350	..	..	4	40	..	..	..	56	Normal
5/2	.....	.....	45.3	2.6	2,550	..	1	3	34	2	..	2	58	Normal
5/3	.....	.....	43	2.85	2,150	1	..	..	32	2	2	..	63	Normal
5/4	.....	.....	41.9	2.62	3,100	..	..	10	18	..	..	4	48	Normal
5/5	.....	.....	45.1	3.27	2,550	1	..	4	44	1	..	..	50	Normal
5/6	.....	.....	49.5	3.17	3,250	..	2	2	74	..	..	..	22	Normal
5/7	.....	.....	44.2	2.87	3,000	..	..	7	70	..	..	..	23	Normal
5/8	.....	.....	41.6	3.12	4,300	..	..	..	75	1	..	..	24	Normal
5/9	.....	.....	43.4	3.29	4,100	..	..	2	72	..	1	1	24	Normal
6/3	.....	.....	73	5.0	7,000	..	..	6	60	3	..	..	31	Normal

days later revealed no evidence of adenopathy or splenomegaly. Petechiae and purpuric spots were seen on the skin of the chest and abdomen. There was marked pallor but no evidence of an icteric tint. There was no heaping up of the gums. The buccal mucosa of the right cheek was the seat of a black, necrotic lesion in a serosanguineous bed. There was bleeding from the gums, especially of the right side.

Cytologic studies of the bone marrow and peripheral blood were then made. In the peripheral stream there were but few cells. It was impossible to count more than 10 cells on a smear. These included a few mature lymphocytes and occasional toxic polymorphonuclear leukocytes, a metamyelocyte and a myelocyte. All the white cells of the myeloid series seen on the smear were definitely toxic. The red cells showed evidence of marked regenerative effort with normoblasts, polychromasia, macrocytosis, anisocytosis and poikilocytosis. The platelets were markedly diminished in number. The examination of the bone marrow aspiration⁷ revealed a hypocytologic marrow with no evidence of the myeloblastic picture of leukemia. The white cells consisted mainly of degenerated cells and smudges. The only significant features were the occasional clusters of erythroblastic cells arranged in a syncytium surrounded by intercellular matrix (fig. 1). It was then decided to introduce into the patient's sternal marrow the marrow of a healthy donor. This was done on the theory that it might supply some inherent hematopoietic quality which is present in healthy marrow but

the bleeding tendency became less apparent. Finally when the platelets were normal in number (as shown in the table) all evidences of bleeding disappeared. Then the increase in the red blood cell count was noted. However, this increase was not significant. The rate of granulocytic increase was slower; this was manifested in that the white blood cell count rose from a low of 750 to 4,300 (fifteen days later) and to 7,000 (forty days later). This was striking in view of the fact that the lymphocytes diminished from a high of 82 per cent to a low of 23 per cent. This could be ascribed only to the neogenesis in the bone marrow, with the appearance of polynucleosis and a slight shift to the left of the white blood cells in the peripheral blood. The hemoglobin seemed to rise slowly and lagged behind the red blood cells. The patient received iron to stimulate further hemoglobin regeneration.

On June 3, forty-two days after admission, examination of the patient revealed no evidence of petechiae or adenopathy. The oral mucous membranes were normal in color and there was no evidence of bleeding from or heaping up of the gums. No exudates were seen and all traces of necrosis had disappeared. The liver and spleen were not palpable. The laboratory examination showed a hemoglobin of 73 per cent, red blood cell count of 5.0 million, white blood cell count of 7,000 and a differential which revealed polymorphonuclears 60 per cent, staff forms 6 per cent, eosinophils 3 per cent, lymphocytes 31 per cent and platelets adequate in number. Bone marrow aspiration revealed an increase of immature myeloid cells (probably hematocytoblasts or premyeloblasts), an increase in both eosinophilic myelocytes and polymorphonuclears

7. Morrison, Maurice, and Samwick, A. A.: A Simple Method for the Aspiration of Bone Marrow, *J. Lab. & Clin. Med.* 24:858 (May) 1939.

(a sign that betokens regeneration⁸) and an increase in megakaryocytes, reticulum cells and plasma cells.

Study of the bone marrow at this time showed that it had a close resemblance to that seen in leukemic myelosis. The marked erythroblastosis, G:E 50:50,⁹ militated against this diagnosis. The marked increase of the hematocytoblastic elements associated with the mature white blood cells gave one the impression that regenerative effort was more or less successful. However, it was not justifiable at this time to credit these results solely to the injection of bone marrow. Further studies are necessary before conclusions can be drawn.

COMMENT

The patient presented a marked deficiency of all the components of the marrow and the rest of the cytologic inhabitants of the bone marrow. He showed a marked anemia, granulocytopenia, thrombocytopenia and an absolute lymphocytopenia. Because of the marked evidence of toxic polymorphonuclear leukocytes, degenerated cells and smudges, it was believed that a true panmyelophthisis was present.

The question of etiology brought up its relationship to drugs (aminopyrine, barbiturates, arsphenamines, sulfanilamide and its derivatives), radiation therapy, vitamin deficiency, contact with the aniline dyes and benzene derivatives. All these factors were carefully investigated and bore no relationship here. Included in the possible causes of this hematologic disorder must be considered leukemia of both varieties, malignancy, infection or sepsis. Leukemia was excluded because of the

course of the disease. Infection was the most likely because of the high temperatures and the inflammation present in the buccal cavity.

The cause and effect relationship is not clear because it is impossible to state whether the latter is secondary

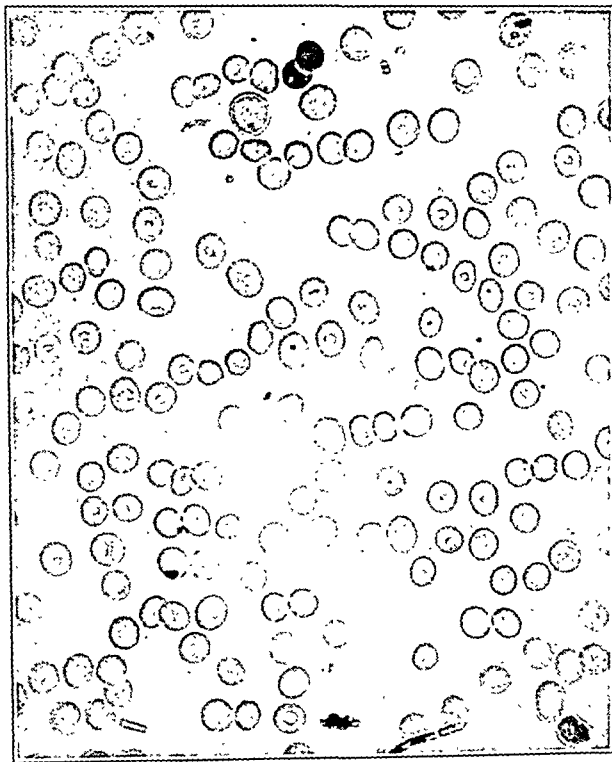


Fig. 1.—Peripheral blood, April 25.

lack of medullary myeloblastosis on three different occasions when bone marrow aspirations were done. Malignancy was ruled out by the clinical and hematologic



Fig. 2.—Bone marrow aspiration, April 25.

to the granulocytopenia or vice versa. One is therefore left with the conclusion that this case is one of idiopathic aplastic anemia.

Suffice it to say, at the present time, that human bone marrow may supply an important element inherent in healthy marrow but absent in aplastic anemia. One cannot attempt to guess what this factor is. It is tempting to suppose, from previous experiences in the development of hematologic disease entities such as pernicious anemia and hypochromic anemia, that there might also be a factor the lack of which is responsible for idiopathic aplastic anemia and bears the same relationship as the erythrocyte maturing factor in pernicious anemia and the iron (Fe) in idiopathic hypochromic anemia. The same concept may hold for granulocytopenia and purpura haemorrhagica.

The brilliant work of Osgood¹⁰ on bone marrow culture led him to attempt the introduction of bone marrow culture intravenously on the supposition that the bone marrow would eventually take, but no opportunity was afforded for settling that assumption. An attempt was made by him to inject bone marrow intrasternally,¹¹ but, evidently for technical reasons, it was found impossible. It is interesting to note that it is a simple matter to introduce bone marrow intrasternally. One is surprised

8. Piney, Alfred: *Recent Advances in Hematology*, Philadelphia. P. Blakiston's Son & Co., 1927.

9. Morrison, Maurice, and Samwick, A. A.: *Clinicohematologic Evaluation of Bone Marrow Biopsies*, *Am. J. M. Sc.* **198**:758 (Dec.) 1939.

10. Osgood, E. E.: *The Histiogenesis, Classification and Identification of the Cells of the Blood and Marrow Based on Cultures and Hematological Studies of Human Marrow and Blood*, *Am. J. Clin. Path.* **8**:59 (Jan.) 1938.

11. Osgood, E. E.; Riddle, M. C. and Mathews, T. J.: *Aplastic Anemia Treated with Daily Transfusions and Intravenous Marrow*, *Ann. Int. Med.* **13**:357 (Aug.) 1939.

with the ease with which the contents are expelled from the syringe with only the slightest amount of pressure. Two of our colleagues in other hospitals are following this method and have experienced no difficulty in several injections. At no time was there any evidence of superficial tumefaction, edema or ecchymosis which could belie the complete entry into the marrow cavity. An important point in the technic is the immediate introduction of the marrow to avoid coagulation. It has been noted that bone marrow coagulates rapidly when exposed to the air.

The question of injecting homologous or heterologous marrow is an interesting one. Following Osgood's hypothesis one would naturally favor the former. However, since one is introducing a "factor" for deficiency diseases, compatibility loses its significance but is nevertheless desirable. It has been found that there is no point in introducing excessive amounts of material obtained from the sternum because it has been noted that the first 1 or 2 cc. consists of true undiluted marrow while the taking of additional quantities is simply taking blood derived from the sinuses diluted with small quantities of bone marrow.

A method so simple affords the possibility of injecting elements or factors present in healthy bone marrow and may lend itself to the solution of many problems. According to Osgood, one of these is the problem of introducing growth centers or transplants. This hypothesis requires further confirmation. In view of our expe-

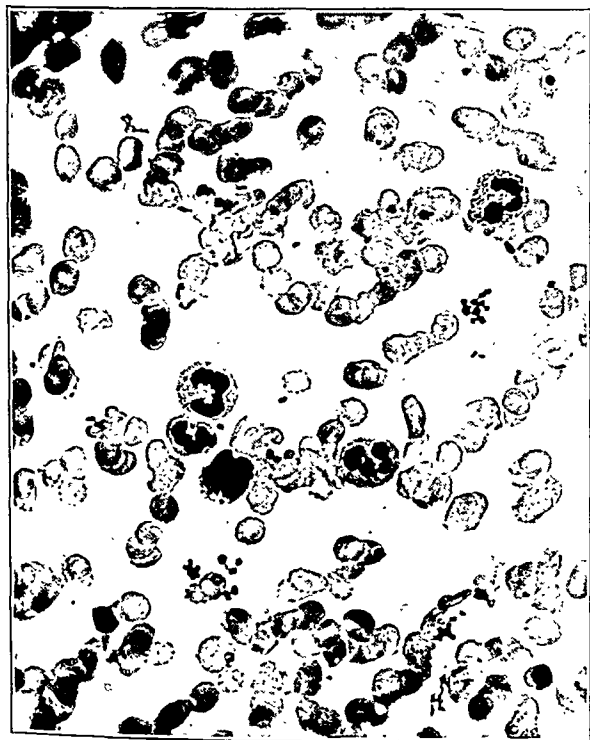


Fig. 3.—Peripheral blood, June 3.

riences in this and two other cases (chronic leukemic myelosis and anerythroplastic anemia) still being studied, it is felt that the more rational basis for success is a biochemical one supplying a factor analogous to the erythrocyte maturing factor or Fe. This brings up definite possibilities in combating various hematologic disorders. In leukemia, for instance, where the neoplastic

and infective theories have been considered, one might envisage the deficiency of a certain substance which does not permit the myeloblast to mature and one might therefore be tempted in future cases to perform an "exsanguination" of the bone marrow in the sternum,

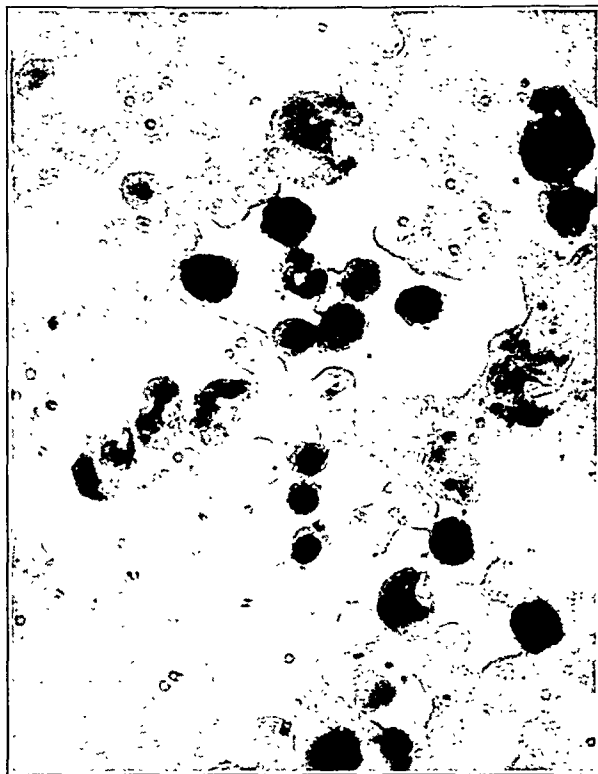


Fig. 4.—Bone marrow aspiration, June 3.

immediately followed by the introduction of healthy bone marrow. This might cause the introduction of a factor that will initiate, either by a local or by a generalized effect, the metamorphosis of a resistant myeloblastosis to a polynucleosis.¹ The same type of procedure might be carried out for thrombocytopenic purpura and granulocytopenia. This method will therefore lend itself to diverse uses. This case is reported not so much for its particular use in aplastic anemia as for presenting a new modality in the treatment of blood dyscrasias secondary to a deficiency of certain hematopoietic factors or principles. The most aplastic bone marrow that can be visualized must always contain stem cells which should be susceptible of being stimulated provided the stimulus can reach the stem cell in the bone marrow. It is unnecessary to postulate that a take or growth of newly injected marrow alone is necessary to attain a successful result.

CONCLUSIONS

1. In a case of idiopathic aplastic anemia, human bone marrow was introduced intrasternally.
2. An unknown factor present in normal marrow when thus injected may stimulate maturation of hematopoietic constituents already present in the diseased marrow, thus supplying a factor to overcome a deficiency disease.
3. Intramedullary (sternal) injections as a treatment is afforded by this method.

250 Ocean Parkway—135 Eastern Parkway.

Clinical Notes, Suggestions and New Instruments

CURE OF A CASE OF ACUTE ULCERATIVE ENDOCARDITIS

SAMUEL ALEXANDER, M.D., AND STEWART F. ALEXANDER, M.D.
PARK RIDGE, N. J.

Acute ulcerative endocarditis has been notoriously fatal. The prognosis was almost hopeless before the advent of chemotherapy. We report one case of acute ulcerative endocarditis which, because of the clinical cure, lends a more optimistic outlook in the treatment of this disease.

REPORT OF CASE

J. C., a white man aged 62, a sea captain in the merchant marine, complained chiefly of malaise and fever. The onset of the present illness occurred two weeks before he was seen, while he was returning from a port on the southern Atlantic seaboard, and was ushered in by an acute infection of the upper respiratory tract. It was accompanied by aches and pains throughout the body but particularly marked in the neck. There were general malaise and a dry, hacking, nonproductive cough. There were irregular episodes of chills and fever, and on several occasions the patient had recorded temperature rises to 104 F. He rapidly lost strength and was acutely ill when his boat came into port and he presented himself for medical attention. His past history was negative save for an episode of tobacco amblyopia more than twenty years before, from which he had recovered.

On physical examination, March 9, 1940, the patient was acutely ill; he was rather slender but well built. There was no cyanosis, dyspnea or edema, and no petechiae were noted. The temperature was 100 F., pulse rate 90 and blood pressure 130 systolic, 75 diastolic. Examination of the head was negative. The eyes, ears, nose and throat were normal. There was equal and adequate expansion of the thorax, and the lungs were clear to percussion and auscultation. The heart was moderately enlarged to the left on percussion and the apex beat was felt 2 cm. outside of the midclavicular line in the sixth interspace. There was regular sinus rhythm; there were no thrills or heaves. There was a soft, low pitched systolic

murmur over the precordial region, with its maximum intensity at the apex. The murmur was not transmitted and it did not fill the entire systolic portion of the cycle. The liver was palpable at the costal margin but was not enlarged, tender or nodular. The spleen and kidneys were not palpable. There were no masses or tender areas in the abdomen or paravertebral regions. The genitalia and extremities were normal. The Wassermann and Kahn tests gave negative re-

sults. Urinalysis was negative. A blood count showed: hemoglobin 75 per cent, red blood cells 3,400,000, white blood cells 10,300; differential count: polymorphonuclear leukocytes 75 per cent, lymphocytes 13 per cent, monocytes 7 per cent, eosinophils 5 per cent.

On x-ray examination both lung fields were completely clear. Oblique and lateral films were also taken to rule out any partially hidden pulmonary focus. The 6 foot heart plate showed moderate enlargement to the right and to the left. The aorta was tortuous and sclerotic, and several small calcific plaques

were present in the knob. The transverse diameter of the chest was 29.5 cm. The transverse diameter of the heart was 16 cm., and the great vessels at the base measured 7.5 cm. The first and second oblique cardiac positions (R. A. O., L. A. O.) confirmed the tortuous, sclerotic nature of the aorta. On fluoroscopic examination there appeared to be normal cardiac pulsations.

On bed rest and antipyretics the patient continued to have a spiking temperature with fluctuations from 98 to 104 F. Agglutinations for *Bacillus typhosus*, *Bacillus paratyphosus*, *Bacillus dysenteriae* and *Brucella melitensis* were negative. Two blood cultures taken March 11 revealed pure cultures of beta hemolytic streptococci.

March 12 it was noted that the systolic murmur had become much harsher and now filled the entire systolic portion of the cycle. From this date the murmur was noted to change its character on several occasions. On March 16 the murmur was very harsh and loud. There was a distinct diastolic murmur extending from the apex up toward the aortic area.

Fifteen grains (1 Gm.) of sulfanilamide every four hours with an equal amount of sodium bicarbonate was started March 13. After ten days the temperature curve was decidedly smoother with daily swings to only 100 or 100.5 F. April 17 the patient's temperature became normal and has remained so ever since. During the second week of treatment the cardiac murmurs began to diminish in intensity and in their degree of transmission. In the third week only the systolic murmur was still audible, and this then vanished completely. At the last examination the heart sounds were excellent with no murmurs present. The patient became symptom free during the third week of treatment. The sulfanilamide dosage was gradually decreased after the fifth week and completely discontinued at the end of the sixth week. Six blood cultures taken subsequent to treatment have all been negative. Repeated urinalyses were all negative. The blood count by July 7 had returned to normal (hemoglobin 85 per cent, red blood cells 4,100,000, white blood cells 6,400; differential count: polymorphonuclear leukocytes 56 per cent, lymphocytes 33 per cent, monocytes 7 per cent, eosinophils 4 per cent).

A 6 foot heart plate on July 7 revealed that the heart had diminished in size considerably. The transverse diameter of the heart now measured 12.5 cm., while the shadows of the great vessels at the base had not been considerably altered. The patient was in excellent health and had returned to his ship command.

COMMENT

The diagnosis of acute ulcerative endocarditis is established by the changing heart murmurs, the positive blood cultures of hemolytic streptococci and the patient's septic course in the absence of other foci of infection.

The absence of embolic phenomena and splenomegaly is not unusual but rather the expected finding in acute endocarditis as contrasted with the manifestations in subacute bacterial endocarditis.

While it cannot be proved, it seems probable that the upper respiratory tract was the portal of entry for the infection. The success of therapy with sulfanilamide in this case may be related to two factors: Therapy was instituted very early in the disease, perhaps before deep bacterial invasion had occurred; secondly, the treatment was persisted in for a period of six weeks. There seems little doubt that moderate dosage,



Fig. 2.—Appearance of the heart, July 7, 1940.



Fig. 1.—Appearance of the heart, March 9, 1940.

long instituted, is more effective for deep seated infections than massive doses for a shorter period of time.

The striking improvement in the cardiac silhouette seems added evidence of cure in this case. The first cardiac measurements are those of a dilated heart secondary to acute valvular disease and septic systemic reaction. The second cardiac measurements represent a relatively normal heart, and the actual changes in cardiac volume are impressive. It is interesting to note the degree of dilatation that was present in this case with no signs or symptoms of failure of either the right or the left side of the heart.

SUMMARY

Cure in a case of acute ulcerative endocarditis due to *Streptococcus haemolyticus* followed moderate dosage of sulfanilamide given over a prolonged period of time.

12 South Main Street.

SUBACUTE BACTERIAL ENDOCARDITIS TREATED UNSUCCESSFULLY WITH SULFAPYRIDINE AND HEPARIN

ESTELLE E. KLEIBER, M.D., NEW BRUNSWICK, N. J.

This case is presented as one of subacute bacterial endocarditis in which treatment with sulfapyridine and heparin was unsuccessfully attempted. Unfortunately, this case had the fatal outcome usual in the vast majority of instances of this disease, but it is felt nevertheless that in the evaluation of a new form of therapy it is important to report the failures as well as the successes and to point out some of the practical difficulties in proceeding with a course of treatment theoretically desirable to stem the infectious process.

Efforts at treatment have been stimulated by the discovery of new chemical agents. Friedman, Hamburger and Katz¹ reported the use of heparin in the treatment of subacute bacterial endocarditis, this drug being chosen on account of its supposed capacity to prevent clot or thrombus formation. At the same time a report was published by Kelson and White² on the use of heparin in combination with sulfapyridine, and these authors were sufficiently impressed to urge further study of the combination of these drugs.

REPORT OF CASE

M. P., an Italian girl aged 19 years, was admitted to St. Peters Hospital Dec. 19, 1939, complaining of evening fever and painful joints. Her family history was essentially negative. Her past history revealed pleurisy and pneumonia at the age of 2 years with thoracotomy for empyema and frequent

TABLE 1.—Sulfapyridine Concentration

Date	Mg. per 100 Cc.
1/11/40	2.5
1/13/40	0.5
1/16/40	6.7
1/17/40	3.1
1/18/40	2.5
1/19/40	2.5
1/21/40	6.5
1/22/40	8.2

attacks of tonsillitis in childhood. Tonsillectomy was done at 16 years. Rheumatic fever with carditis occurred at 11 years and 16 years. She was admitted to the Cardiac Clinic at Middlesex Hospital, where she had been observed from March 1939, her chief complaint being cough, dyspnea, orthopnea and occasional precordial pain. She was found to have active rheumatic heart disease with mitral stenosis and insufficiency, cardiac enlargement and tachycardia. The PR interval was 0.22 second. The patient was advised to continue bed rest;

1. Friedman, Meyer, Hamburger, W. W., and Katz, L. N.: Use of Heparin in Subacute Bacterial Endocarditis, *J. A. M. A.* **113**:1702 (Nov. 4) 1939.

2. Kelson, S. R., and White, P. D.: A New Method of Treatment of Subacute Bacterial Endocarditis, *J. A. M. A.* **113**:1700 (Nov. 4) 1939.

she was put on a high caloric diet with additional vitamins, and digitalis intake was temporarily reduced. Salicylates were given for symptomatic relief. Her temperature was normal on every clinic visit. From March 1939 until her admission in December to the hospital the patient was not under medical supervision.

On admission to the hospital the patient gave a history of having had a fever and cough for one month, diagnosed as grip by a physician called into the home. She had mild joint pains and occasional precordial pain radiating to the back. On physical examination her condition was similar to that just related with certain important additions: (1) fever of 100 F., (2) tender spleen palpable three finger breadths below the left costal margin, (3) tenderness of the finger tips, (4) more pronounced pallor and (5) petechial hemorrhages in the conjunctivas and on the extremities.

The blood count on admission showed hemoglobin 70 per cent, red cell count 3,950,000, white cell count 5,900, polymorphonuclear leukocytes 72 per cent, lymphocytes 23 per cent, monocytes 4 per cent and eosinophils 1 per cent. During the sulfapyridine therapy, blood counts were repeated daily and showed very little variation except for a transient rise in the white cell count to 16,800. The only significant change in the hemoglobin content occurred Jan. 23, 1940, when she had had a frank hemorrhage; then the hemoglobin content was reduced to 42 per cent with 2,740,000 red blood cells. Following transfusion, the values remained between 55 and 66 per cent, with a red blood count of 3,800,000. Sulfapyridine concentrations are shown in table 1 and the results of blood cultures in table 2. Blood chemistry January 23 showed uric acid 3.3 mg. per hundred cubic centimeters; February 1 urea nitrogen was 11.2 mg.; March 22 urea nitrogen was 10.5 mg. and sugar 81.5 mg. The Kline test gave negative results. The sedimentation rate Dec. 20, 1939, was 12 mm. in one hour and five minutes. The circulation time March 8, 1940, was eleven seconds.

On admission the urine showed an acid reaction, a specific gravity of 1.022, a trace of albumin and an occasional white blood cell. X-ray study of the heart confirmed a previous fluoroscopic examination suggestive of mitral stenosis. It also showed a slight accentuation of bronchial markings, especially on the right side. The temperature during the first few weeks fluctuated between 100 and 102 F.; thereafter it became more spiking in character and reached a much higher average elevation (104 F.), except for certain variations to be noted.

After the first positive blood cultures on Jan. 5 and 8, 1940, it was decided to start medication with sulfapyridine together with heparin in an effort to prevent further vegetations. The patient was given 30 grains (2 Gm.) with 20 grains (1.3 Gm.) of sodium bicarbonate repeated in four hours, with subsequent doses of half this size every four hours. Ascorbic acid (200 mg.) was administered daily for three days and 100 mg. daily thereafter. The patient tolerated the drug poorly, vomiting after each dose, but her temperature became normal for the first time since admission.

On January 11 sulfapyridine concentration of the blood was only 2.5 mg., and a sharp pain developed in the region of the bladder and dull pain with tenderness over the right kidney. The urine showed many red blood cells; this may have been due to sulfapyridine or more likely to embolic glomerulonephritis. Because of the gastrointestinal upset sulfapyridine medication was attempted by rectal suppositories, but the blood level could not be raised above 0.5 mg. in this manner and therefore on January 16 oral medication was resumed and was much better tolerated. The concentration in the blood now rose to 6.5 mg. and no further red blood cells were present in the urine. January 17 the patient passed two reddish brown calculi following an episode of renal colic. These stones consisted mostly of uric acid, though a few sulfapyridine crystals were found in them. On January 19 heparin was started by continuous intravenous drip, 10,000 units to every 500 cc. of physiologic solution of sodium chloride. Bleeding and clotting time were determined daily during this period but no significant changes were noted. The urine again became bloody and

after a total of 90 cc. of heparin (900,000 units) had been given gross hematuria started and several uric acid stones were passed. Her pallor increased and the cough became severe. Heparin and sulfapyridine were both discontinued because of the progressive anemia, weakness and bleeding. Several small transfusions were given. On January 31 a cerebral embolus developed. Blood culture showed more than 200 colonies. Sulfathiazole then was given temporarily but failed to change the picture. Thereafter her course was steadily downhill till her death on June 5 with right hemiplegia.

At autopsy the diagnosis was confirmed and on microscopic section some healing was found in the vegetations on the mitral valve and auricle. Multiple infarcts were present in the spleen and kidneys.

COMMENT

This case presented a known continuous rheumatic heart infection for at least a year and a half previous to the onset of the present illness, as shown by continuous tachycardia, frequent precordial pain, accelerated sedimentation rate and a prolongation of the PR interval in the electrocardiogram. It presented, therefore, suitable soil for the implantation of a bacterial endocarditis. This condition was confirmed soon after the patient's admission and a plan of treatment was determined.

Certain practical difficulties presented themselves almost immediately after treatment with sulfapyridine was started. The drug proved to be toxic to the patient in that she was rendered continuously nauseated and vomited frequently during

TABLE 2.—Blood Culture

Date	Culture
1/ 5/40	30 colonies per cubic centimeter of <i>Streptococcus viridans</i> after 48 hours
1/ 8/40	30 colonies per cubic centimeter of <i>Streptococcus viridans</i> after 48 hours
12/20/39	30 colonies per cubic centimeter of <i>Streptococcus viridans</i> after 3 weeks
12/22/39	30 colonies per cubic centimeter of <i>Streptococcus viridans</i> after 3 weeks
1/23/40	Negative
1/26/40	Negative
2/ 4/40	Negative
2/19/40	Approximately 200 colonies of <i>Streptococcus viridans</i> per cubic centimeter

the early days of its administration. This made it difficult to maintain a suitable level of blood concentration, nor could the latter be maintained by a change to rectal administration. Even more troublesome than this problem was that of the increased tendency to bleeding, induced probably by the intravenous administration of heparin. Three days after the beginning of sulfapyridine therapy the patient first experienced renal pain and passed several calculi. To our surprise, the stones consisted chiefly of uric acid with a few crystals of sulfapyridine, which may have served as a nucleus in the further deposit of the other material.

Gross hematuria became a major problem only after the administration of heparin. In spite of the fact that the coagulation time was not markedly changed, the patient's condition became so alarming that it was necessary to omit both sulfapyridine and heparin in order to combat the progressive anemia. As can be seen by the laboratory observations in table 2, three negative blood cultures were obtained after the administration of sulfapyridine had resulted in adequate blood concentration of the drug, and it was only following the cessation of this treatment that cultures again became positive. It is of interest that at autopsy some evidence of healing in the vegetative processes was found in the auricle and on the valves.

SUMMARY

1. In a proved case of subacute bacterial endocarditis sulfapyridine and heparin were given and the blood cultures were temporarily rendered sterile.

2. Severe hematuria necessitated the cessation of treatment.

3. Evidence of healing of some vegetations was found at autopsy.

131 Livingston Avenue.

NAIL LACQUER DERMATITIS

LESTER HOLLANDER, M.D., PITTSBURGH

Three cases of nail lacquer dermatitis came under my observation showing a similarity of clinical signs and therefore considered worthy of record:

CASE 1.—Mrs. E. E., aged 26, an American housewife, presented herself on account of an eruption of six months' duration, which affected the upper eyelids, the face about the chin, two sharply defined plaques on the left side of the neck under the chin and areas about the hairline and the nucha. Itching and burning were severe enough to awaken her during the night; although annoying during the day, they were most acute at night and on arising.

Cosmetics were suspected by the dermatologist who attended her, but since patch tests to powders and creams were found to be negative a diagnosis of neurodermatitis was made. She was treated chiefly with x-rays, which would ameliorate the symptoms, but then the condition would return with intense violence.

When she came under my care she was ordered to discontinue all of her cosmetics and within four days a marked improvement was noted, giving the first corroboratory evidence that I was dealing with a cosmetic dermatitis. After a period of two weeks she was allowed the use of a single cosmetic each week. The first week she was permitted the use of a lipstick. The second week face powder was added. The third week she was permitted the use of nail lacquer. Within forty-eight hours the two peculiar plaques on the left side of the neck reappeared and the upper eyelids became reddened. It was easily discerned then that the nail lacquer was the cause of the trouble, and the manner of its production was also apparent. The patient, by doubling her hands, kept her nails against her neck during her sleep. She slept on the left side and she used her hands as a support.

Discontinuation of the nail lacquer was followed by disappearance of all her symptoms.

CASE 2.—Miss A. M. P., aged 21, an American, presented herself on account of an eruption which affected her eyelids and chin. This eruption would come and go and was of one year's duration.

Patch tests were made on her with all her cosmetics and all the tests gave negative results. However, she was placed on the regular removal and replacement routine followed in these cases, and the irritant was thus found to be the nail lacquer. In this case also the discontinuation of the use of nail lacquer was followed by complete recovery.

CASE 3.—Mrs. H. McV., aged 32, a beauty shop operator, presented herself on account of a marked dermatitis of the upper eyelids and several areas about the chin. The condition was a recurring one and of about two years' duration. Itching and burning were annoying symptoms, chiefly at night. Without any apparent reason the eruption would fade and then, apparently without any reason, it would light up again, each time to be more pronounced. She definitely stated that her beauty shop had nothing to do with it as these areas of dermatitis were worse during her vacation periods, which, of course, were spent away from the beauty shop.

The elimination of cosmetics was a more serious problem with this patient. However, after several trials at guessing at the cause, each of which failed, the patient was persuaded to stop all her cosmetics. The permission to use nail lacquer was followed by the recurrence of the upper eyelid eruption and faint signs of dermatitis about the chin. Discontinuation of nail lacquer cleared this troublesome contact dermatitis.

COMMENT

The points of similarity in these three cases may be taken up under several headings:

1. There was a similarity of the involvement of the affected areas. In each case the eyelids and areas of the chin below the lower lip were involved. This must have occurred by contact, such as straightening the eyebrows with the lacquered nails and possibly by the habit of playing with the areas on the chin. In case 1 the peculiar distribution on the left side

From the Pittsburgh Skin and Cancer Foundation.

of the neck has been explained. This particular involvement handicapped one's suspicion of the real offending agent. One would imagine that nail lacquer dermatitis would affect the nail folds or perhaps the palmar surfaces, chiefly those of the thumbs. None of this involvement was present.

2. In each instance the patch testing gave negative results, even with the offending agent. This can be explained only on the presumption that sensitivity of the affected areas occurred after repeated contacts and that this sensitivity was cultivated.

3. Subjective symptoms were noted chiefly at night. This is explained by the hypothesis that it was during the sleeping period that the nail lacquer came in contact with the affected areas more continuously and more frequently.

4. A word of explanation is needed in describing the method which I prescribe when the use of cosmetics is interdicted. The patient is ordered to shampoo her hair or to have some one shampoo it at home in order to remove waveset, hair oil, hair tonic, hair dressing, scalp ointment or any of the various types of so-called rinses which are used to bring out sheen or color of the hair. After the shampoo the hair is rubbed dry with a turkish towel. The patient is instructed to cover her hair with a large kerchief before retiring so that if by some chance any of the aforementioned cosmetics should remain attached to the hair shaft they would not become operative again as irritants or sensitizers.

All creams—cleansing, foundation, tissue, cold and vanishing—are ordered discontinued. The patient is instructed to wash her face with a certain nonscented soap so that one can be sure of the absence of perfume. The nail lacquer is ordered removed. Sachet powders, perfumes, lipstick, eye shadow, eyebrow pencil, eyebrow and eyelash ointments, artificial lashes and artificial nails are interdicted each by name. It is only after the recital of each of these and the thorough understanding by the patient of the word "cosmetic" that one may be reasonably certain that the instructions will be followed.

5. In two of the three cases a dermatitis caused by cosmetics was suspected by the attending dermatologists. The peculiar distribution of the eruption and the misleading patch tests threw both of them off the proper diagnostic track.

6. I should like to mention the great dissimilarity of the cutaneous textures of these three patients. The first was a brunette; her skin was thickened and oily. The second patient was a very light blonde with markedly freckled and satin-like skin. The third patient was a brunette with normal cutaneous structure, showing that sensitivity, at least in this group, had nothing to do with skin structure.

CONCLUSION

The manifestations of three cases of nail lacquer dermatitis occurred on particular areas of the face, and there was a total absence of cutaneous symptoms about the nail folds or other parts of the hands. It is reasonably safe to assume that on account of this distribution some cases go unrecognized. Therefore emphasis must be made of the fact that in reality the symptoms of contact dermatitis should be logically looked for about the face, since nail lacquer, acting either as an irritant or as a sensitizer, will come in contact with the face more frequently than with any other of the exposed cutaneous surfaces.

Look for nail lacquer dermatitis on the face.

631 Jenkins Building.

Self Reliance.—A key to the mental hygiene of early childhood lies in building up adequate self dependence. Even in infancy this principle of self dependence must be respected. Not only from the breast must the child be weaned. By slow gradations he must develop fortitudes which lie at the basis of detachment. He cannot always play in his mother's lap; he must in time begin to play in his pen. He cannot always play in the same room with his mother; he must learn to play in an adjoining one. . . . These are elementary lessons in self reliance, but the detachment must not be hurried, and all along the path of preschool development our demands should be tempered to meet the child's immaturity.—*The First Five Years of Life—A Guide to the Study of the Preschool Child*, New York, Harper & Brothers Publishers, 1940.

Special Clinical Article

THE MANAGEMENT OF PATIENTS WITH HEART FAILURE

CLINICAL LECTURE AT NEW YORK SESSION

SAMUEL A. LEVINE, M.D.

BOSTON

Amid the national discussion concerning medical practice and the care of the sick it is well for members of the medical profession and the nonmedical public as well to realize that the treatment of disease has improved greatly during the past generation. It is obvious that new therapeutic discoveries such as insulin, liver extract, sulfanilamide and other specific remedies have saved many lives. But what is not so clearly understood is that old remedies are now more intelligently and more effectively applied, with the result that suffering is diminished and life is prolonged. This is particularly true of heart disease. Even in the short span of twenty years I have witnessed a striking improvement in the care of patients suffering from cardiac disorders in general practice. We may bewail the passing of the old family practitioner and the loss of his service in the civil affairs of his community and his wise counsel in many domestic problems that he helped solve but we need not lament about the character of the medical service that the average citizen is receiving at the hands of the present family physician.

From fifteen to twenty years ago a majority of the patients with congestive heart failure that I saw in consultation could be helped considerably and in many instances could be rehabilitated to a useful life. They had not received the benefit of the known therapeutic procedures then available. They had not been given adequate digitalis or diuretics, an extensive hydrothorax went undetected, an underlying thyrotoxicosis was overlooked or some other error in diagnosis or treatment accounted for the failure to recover compensation. Now, as a result of the superior training and the greater dissemination of present knowledge, it is the exceptional case in which a consultant is able to improve greatly the outline of treatment as prescribed by the practitioner and then it is more apt to be the result of a more accurate diagnosis. For this reason the first step in the proper care of a failing heart is a correct diagnosis.

This discussion will be confined to the treatment of heart failure, often called congestive heart failure, and is not meant to include the treatment of angina pectoris or acute coronary thrombosis. At the outset it must be clear that many conditions still confused with heart failure are, in fact, instances of peripheral circulatory failure or of simple tachycardia and that the treatment that is effective in the one will be entirely valueless and at times harmful in the other. The rapid pulse, cold extremities, asthenia and collapse frequently seen in infections like pneumonia or in postoperative shock are not due to heart failure. Similarly many patients with dyspnea are suffering from chronic bronchitis, emphysema, tumor of the lung, aneurysm of the aorta or other noncardiac disorders. In fact, there are numerous instances in which breathlessness is due merely to

From the Medical Clinic of the Peter Bent Brigham Hospital and the Department of Medicine, Harvard Medical School.
Read in the Medical Division of the General Scientific Meetings at the Ninety-First Annual Session of the American Medical Association, New York, June 11, 1940.

obesity, general weakness, anemia, psychoneurosis or hysteria. Even swelling of the legs may be misinterpreted as an evidence of heart failure when the cause is varicose veins, phlebitis or hypoproteinemia. Furthermore, enlarged liver and ascites, so commonly the result of heart failure, may be confused with cirrhosis of the liver and abdominal neoplasms. It is obvious that we must start with an accurate diagnosis and know that the heart itself is at least in part responsible for the symptoms that we are treating.

Another difficulty that arises is the distinction between heart disease and heart failure. Although it may be generally assumed that the latter cannot be present without the former, patients often have heart disease for a great many years without evidence of failure. During these years they may be quite well or have functional symptoms or present themselves with symptoms of other noncardiac disease. It is obvious that treatment directed at heart failure when a structurally diseased heart is well compensated will not only be useless but may be harmful. Accurate diagnosis is therefore imperative not only in determining the presence or absence of organic heart disease but in estimating the degree of cardiac efficiency.

When there is doubt as to whether the symptoms or signs in a given case are due to heart failure or to some other condition, it may be necessary to investigate the problem by means of special laboratory procedures. It is not my purpose here to discuss the various examinations there may be or, in fact, need to be carried out to make this differentiation. Suffice it to say that occasionally one is compelled to measure the velocity of blood flow, the venous pressure, the vital capacity of the lungs, the blood volume or other aspects of the circulation in order to decide whether a given patient has or has not congestive heart failure.

Having concluded by one means or another that a given patient has congestive heart failure, let us trace the plan of treatment. The measures to be employed and the time spent in the entire program will naturally depend on the severity and the individual peculiarities of the case. Among these factors must be considered the economic and psychologic circumstances involved. It is obvious that matters such as special nurses, a prolonged vacation or a sea voyage may be intelligently employed in one case and be prohibitive in another. These are questions that should be carefully considered with due regard to the expense and the results to be expected.

Let us assume that we are confronted with a patient in average financial circumstances who has early congestive failure on the basis of hypertensive heart disease. The treatment to be discussed will not be materially different whether the underlying cause is valvular disease, coronary artery disease or syphilis. The prognosis or response to treatment may differ but, except for specific conditions to be discussed later, treatment will be the same.

REST

Of primary importance is rest. Except for the mildest cases, in which merely curtailment of some activities or the institution of rest periods in the afternoon or over week ends will suffice, it is advisable to have the patient rest at home or in a hospital. It often proves to be a waste of time to compromise with half measures or to send the patient away for a vacation which is apt to be both expensive and worthless.

We have been taught that the heart obtains its maximum rest with the patient in bed twenty-four

hours a day. Although this is generally true, certain clinical experiences viewed in the light of recent experimental observations necessitate reconsideration of this very important question. All physicians are familiar with the story some patients tell us that they feel respiratory distress only at night. Nocturnal dyspnea and suffocation is common in conditions accompanied by primary left ventricular strain. Patients with hypertension, coronary artery disease, aortic valvular disease and less frequently those with mitral stenosis may have attacks of nocturnal breathlessness in bed and yet feel quite comfortable while up and about during the day. It is surprising that until the present, on instituting a course of treatment, we have insisted that such patients should be put to bed. I know that at times I have urged such a course when the patient himself would plead to be permitted to remain up and about or at least to sit in a chair. In most cases when such patients are put to bed and a suitable medical regimen for heart failure is carried out, clinical improvement takes place and compensation is restored. In some instances, however, patients who do not appear to be in a critical condition steadily go down hill and die. We can all recall experiences in which it seemed that from the time the cardiac patient was put to bed the condition grew worse. It is my purpose to throw some light on this apparent paradox and to try to define the limitation of strict bed rest treatment.

When patients are put to bed there result some simple changes in the dynamics of the circulation. It is obvious that, with the legs elevated or horizontal, return flow of blood or fluid from the periphery is facilitated. This tends to increase the filling of the right side of the heart and the lungs. Under normal circumstances the increased inflow into the right side of the heart is counterbalanced by an increase in the output of each ventricle and no troublesome stagnation develops. But if the left ventricle is already overburdened and cannot keep pace with the increase in blood to be expelled or if there is a sufficient obstruction in the mitral valve the added blood may be partially trapped in the lungs, resulting in congestion or pulmonary edema. It is known that normally¹ there is a decrease in the total lung volume of over 300 cc. and a decrease on the vital capacity of the lungs of about 200 cc. in the recumbent position. Very likely these figures are even greater for patients already suffering from pulmonary congestion. These changes must indicate an increased congestion of the pulmonary vessels. Not only is the limited breathing space further reduced but the congestion of the lungs acts as a trigger mechanism through reflexes in the production of paroxysm of dyspnea. Although there are other factors in the production of dyspnea, the aforementioned mechanism plays a significant role.

These single observations serve to explain some common clinical observations. It frequently happens, when an ambulatory patient who primarily complains of dyspnea is put to bed, that during the first few days pitting edema of the legs disappears. Simultaneously in some cases evidence of pulmonary congestion and dyspnea increases. Some of the peripheral fluid has shifted into the lungs. This may occur even when no pitting is detected, for cardiac patients can have several liters of tissue edema without obvious pitting. Now such a patient may be in a much worse condition, for fluid in the legs does but little harm whereas additional

1. McMichael, John, and McGibbon, J. P.: Postural Changes in the Lung Volume, *Clin. Sc.* 4: 175 (Nov. 2) 1939.

fluid in the lungs may be dangerous or even fatal. I have often detected hydrothorax develop in patients after being put to bed who previously had only a few moist basal rales. The foregoing is an indication of deleterious change in the dynamics of the circulation. I have recently observed a fall of the vital capacity of the lungs during the first day or two after instituting bed care in some of my cases.

The reason that harmful results from strict bed rest are not encountered more frequently is that in most cases the beneficial effects of rest, diet and medication outweigh the harmful effects of posture. The improvement in the efficiency of the heart is great enough to keep pace with the increase in return flow. However, in a small group of cases when such preliminary improvement does not or cannot take place the effect is harmful and may be disastrous. The danger is greater in older patients, in those with serious heart failure, and especially when there is paroxysmal nocturnal dyspnea.

The inference from the foregoing is that, although complete bed rest is often desirable in the treatment of heart failure, careful observation is necessary to see that the very symptom we are treating, i. e. breathlessness, is not made worse. There will be times when one should deliberately keep patients in a chair to avoid this danger or to undo the harm produced by the recumbent position. Patients with paroxysmal cardiac dyspnea have been treated successfully by medication even while being allowed to remain ambulatory.² I feel quite certain that I have occasionally saved a patient's life by taking him out of bed and allowing him to sit in a chair with his feet hanging down. The following experience is illustrative:

A shopkeeper aged 58 had a typical attack of acute coronary thrombosis. During the three weeks following the onset, severe increasing dyspnea developed. When I saw him he was somewhat irrational, having marked orthopnea and Cheyne-Stokes breathing. The lungs were full of rales but there was no peripheral pitting edema. He had been in bed under an oxygen tent most of the time. I advised taking him out of bed, to discontinue the various medication such as aminophylline and to place him in a chair with his feet hanging down. Within a few hours his condition began to improve. Two days later he showed edema of the lower legs but the orthopnea was practically gone. He then received digitalis and mercupurin, had a satisfactory diuresis and gradually recovered compensation. He has been ambulatory and in fairly good health the past three years. The turning point in this patient's condition occurred directly after getting him out of bed into a chair.

Now we may return to the hypothetical patient who is being put to bed. It generally requires a period of three or more weeks, depending on individual factors. The bed should be made comfortable with proper pillows or back rest as circumstances require, so that bodily relaxation may be obtained. He should remain in bed constantly except to the degree to which the chair treatment may seem preferable, according to the considerations just discussed.

DIGITALIS

The mainstay of drug therapy in heart failure is digitalis. Despite the enormous amount of labor spent in the study of the pharmacologic action of digitalis, controversies still exist concerning its exact effects on the heart and peripheral circulation in normal and pathologic conditions. Its clinical value in heart failure needs no further proof. For practical purposes it matters but little nowadays what common preparation is used.

There may be minor differences in potency but at present practically all digitalis in general use in this country has been satisfactorily standardized. There no longer is any need to purchase expensive preparations. The simplest method is to use the drug in the form of a pill, tablet or capsule. Equally good results can be obtained with a tincture, but it is less convenient to the patient and more difficult for the physician to know exactly how much is being taken. A drop is not a minim and the number of drops that equal one cubic centimeter will depend on the size of the dropper, the angle at which the dropper is held and the speed with which the drops fall. For these reasons a pill containing 0.1 Gm. (1½ grains) is recommended.

The patient, assuming he had no previous digitalis, may be given one pill orally four or five times the first day. A similar amount may be given the second day. It is expected, in the average case, that from fifteen to twenty pills will be necessary to effect digitalization. Because patients vary in the amount they require, it is important after the second day to watch for desirable or harmful effects. If no significant results have been obtained, the same dose of five pills may be continued for the third and fourth days. If partial effects have been noted, the daily dose may be cut down gradually to three or two. After a therapeutic result has occurred it generally is advisable to administer a so-called maintenance dose of about one pill (0.1 Gm. or 1½ grains) each day, which may be kept up more or less indefinitely. The toxic effects that would necessitate temporary omission of the drug are nausea and vomiting (not ascribable to heart failure or causes other than the drug), yellow vision, diarrhea or certain irregularities of the heart. The main disturbance of the heart itself that indicates toxicity is bigeminy due to ventricular extrasystoles. Other rare disturbances are complete heart block, undue slowing of the heart and very rarely auricular fibrillation. When first or second degree heart block results from digitalis some caution must be exercised in giving large doses, but no harm has been produced.

It must be borne in mind that digitalis is indicated in congestive heart failure whether the blood pressure is high or low, whether the rhythm is regular or grossly irregular and whether the rate is rapid or slow. It is to be used in myocardial or in valvular disease, whether fever is or is not present and whether the basal metabolism is normal or elevated. The results to be expected may differ under varying circumstances but the indication for its use remains the same.

If the condition of the patient is more critical and a more prompt effect is desired, digitalis should be given intramuscularly. For this purpose ampules containing one cat unit (0.1 Gm., or 1½ grains) are available. If no digitalis had been given in the previous several days, 0.5 Gm. may be injected deep into the gluteal muscles in one dose. This amount or a slightly smaller dose can be repeated in several hours if the circumstances warrant it. In fact, on very rare occasions when minutes seem precious, 0.5 Gm. may be injected intravenously. Results can be obtained in from one to two hours from intramuscular injections and in from fifteen to thirty minutes from intravenous injections.

There are many instances in which nausea, abdominal distress and even vomiting occur in congestive heart failure. Often the question arises whether these symptoms are due to digitalis. When abdominal complications such as gallstones or mesenteric thrombosis can be satisfactorily eliminated from consideration, it will generally be found that the situation requires more

2. Harrison, T. R.: Personal communication to the author.

rather than less digitalis. Occasionally careful electrocardiographic study will be necessary to make this decision. When auricular fibrillation is present and the apex rate is rapid, one can be fairly certain that insufficient digitalis has been given, provided hyperthyroidism is not present. When the cardiac rhythm is regular the fact that the rate is rapid is no proof that the heart can stand more digitalis. In some cases whether more or less digitalis is needed can be ascertained only through trial and error, for the main point is whether the clinical condition improves with one type of regimen or another. When gastrointestinal symptoms are prominent they may interfere with the administration of digitalis by mouth. In that case it can be given in the form of tincture rectally, the dose being about the same as the ordinary oral dose. For this purpose 4 cc. of a tincture in from 50 to 100 cc. of water may be injected daily for several days. When a cardiac patient in failure has already received an unknown amount of digitalis the foregoing regimen may need to be modified with smaller doses. One will have to use greater care, watching for toxic effects.

DIET

In the ordinary case of heart failure the dietary problem is not very important. Often it proves helpful to give a Karel diet for a few days, which consists of a glass of milk four times a day. This may be followed by small quantities of a general house diet. When there has been a history of dietary deficiency, vitamins, especially thiamine hydrochloride, should be given. Salt should be reduced to a minimum. It has been customary to restrict fluids to about 1 liter (quart) a day but I think it better to be more generous with the fluid intake, especially for older persons. It is well to avoid thirst and dryness of the mouth. When there has been considerable loss of fluid through sweating or if there is a tendency to an increase in the nonprotein nitrogen in the blood, it may be necessary to force fluids for short periods of time.

There is too little to be gained by purgation to compensate for the discomfort and weakening effect of frequent bowel movements. A bowel movement obtained once daily or every other day is all that is necessary. Simple cathartics or enemas may be used for this purpose.

SEDATION

Whenever necessary, cardiac patients should be helped to obtain a comfortable night's sleep. Mild sedatives such as chloral hydrate, phenobarbital or related products may be sufficient. Often they are ineffective and prolonged experimentation with the barbiturates should not be carried out, for many patients require narcotics when breathlessness or pain is the cause of restless nights. A hypodermic of one-sixth or one-fourth grain (0.01 or 0.016 Gm.) of morphine is generally advisable. It is a common experience that a patient suffering from congestive heart failure who has had poor nights shows the first evidence of improvement following the administration of morphine.

DIURETICS

In considering drug therapy of congestive failure, diuretics come next in importance to digitalis. Various preparations are available for this purpose and one may have to experiment with one or another medication to find which is most suitable in any particular case. Theophylline or aminophylline from 2 to 5 grains (0.13 to 0.3 Gm.) three times a day may be given orally. Sometimes a large single dose of these drugs repeated at intervals of five or seven days may be useful. These

preparations may produce nausea, but when a suitable dose is tolerated it can be continued for long periods. In recent years the mercury diuretics have proved to be the most effective means to get rid of edema. When the ordinary regimen of rest and digitalis has not established satisfactory compensation, preparations like mercurpurin may be injected intravenously or deep into the gluteal muscles. Care in injection is imperative, because distressing sloughs may result if some of the drug leaks out of the vein or is injected subcutaneously. The dose varies from 0.5 to 2 cc. and can be repeated every five to seven days, even for long periods. It is rarely necessary to give more than 1 cc. and then only when the smaller dose has begun to lose its effectiveness and no harmful results have occurred. Occasionally mercury suppositories may be effective but their use is limited because local rectal irritation often results and the diuretic effects are not as good as with the hypodermic method of administration. Mercury diuretics should not be given if acute nephritis is present. When a cardiac patient also has chronic nephritis, although one would prefer to avoid these preparations, at times they may still be useful. In older patients and in some younger ones who are very sick, occasionally ill effects from mercury diuretics occur. I suspect that we can minimize this danger by permitting a larger intake of fluid in these cases.

As a part of the administration of mercury diuretics it has been found that giving ammonium chloride (from 15 to 30 grains, or 1 to 2 Gm., three times a day) may improve the results. This may be continued in some cases for long periods. In fact, a diuresis on ammonium chloride may occur before the mercury is injected and occasionally it will be found that the patient becomes entirely edema free on this regimen alone and does not require a mercury diuretic.

MECHANICAL METHODS OF TREATMENT

Apart from the preceding outline of treatment for congestive heart failure there are other procedures that are required in individual cases. The physician should watch for evidence of hydrothorax, for if there is a significant amount of fluid in the pleural cavities (especially the right) thoracentesis will be necessary. Similarly if there is an embarrassing amount of ascites abdominal paracentesis should be carried out. In some cases effective diuresis by the use of the drugs discussed will be possible only after the removal of the abdominal fluid and the release of pressure on the renal vessels. Occasionally a distended bladder which prevents a diuresis from occurring is overlooked and needs catheterization. In a rare case of stubborn massive edema of the legs, Southey tubes may be employed. Finally the use of phlebotomy must be considered. We know that there is almost always a marked increase in blood volume in congestive failure. In cases in which there are marked venous distention and engorged liver, removing from 400 to 500 cc. of blood is often of great value. In cases of acute pulmonary edema or paroxysmal dyspnea, if improvement does not occur following a hypodermic injection of morphine, phlebotomy often gives prompt relief. A measure not quite as effective but with a similar purpose is to apply tourniquets around the four extremities, pooling the blood temporarily in the periphery.

It is obvious that the choice of these therapeutic measures will vary under different circumstances. In the mild cases of heart failure simple measures will be sufficient while in the very severe all procedures may need to be applied to attain compensation. In some

of the latter oxygen therapy, both for acute emergencies and occasionally for long periods, may prove valuable. When satisfactory clinical improvement has occurred or when a stationary condition has been reached, the patient may be gradually allowed to get out of bed and to increase his activities. In the process of rehabilitation it must be emphasized that the patient's subsequent life will need revision. The fact that heart failure developed (unless brought on by a specific cause such as infection) is evidence that the heart cannot tolerate the previous activities, and lessening of the burdens, both physical and emotional, is desirable. Longer rest periods are therefore necessary. In planning the details of these changes, cooperation between the family, the patient and the physician will be required.

PREVENTIVE AND CURATIVE MEASURES

The physician often has the opportunity to anticipate and thereby prevent or delay the development of heart failure in patients who have compensated heart disease. In this regard he must bear in mind the important precipitating or aggravating causes that tend to bring on decompensation. These are infections, overexertion, pregnancy, anemia, prolonged emotional strain, obesity, hyperthyroidism or any factor that significantly increased the work of the heart. As far as possible these should be avoided or minimized.

Finally, there are certain conditions in which heart failure is due to curable disease and the processes are reversible. Many instances of heart failure accompanying thyrotoxicosis can be dramatically relieved by subtotal thyroidectomy. A rare case of failure due to arteriovenous fistula can be cured by closing the shunt surgically. Heart failure due to myxedema, anemia or beriberi may respond readily to appropriate specific therapy. Heart failure during toxemia of pregnancy or with acute nephritis may disappear entirely under digitalis and other cardiac therapy. The physician should constantly be on the alert to discover the rare case of constrictive pericarditis, for this may be cured or greatly relieved by surgical measures and will not be helped at all by medical therapy. Infections may be the cause of heart failure and measures should be employed as far as possible to prevent infection. Furthermore, there are many cases in which heart failure is directly due to an abnormal rapid cardiac mechanism such as auricular tachycardia, flutter or fibrillation or to ventricular tachycardia. These almost always can be controlled by measures that stimulate the vagus nerve or by appropriate digitalis or quinidine therapy. It is clear that although the individual types of "curable heart failure" mentioned are not common, the entire group is not inconsiderable. The fact that they are curable lends great importance to these cases and should emphasize the need for accurate diagnosis.

SUMMARY

Among the various elements in the treatment of congestive heart failure rest in bed has always been regarded as most important. There are both theoretical and practical considerations which indicate that bed care may be actually harmful in certain cases and that rest in a chair is preferable. It is suggested that this question be reanalyzed in the light of newly acquired knowledge.

There is a small group of cases with congestive heart failure in which the condition is actually curable and the morbid processes reversible. Careful diagnosis is imperative if we are to recognize these cases.

270 Commonwealth Avenue.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING CHAPTER, WHICH IS THE FIRST OF A SERIES ON AMPUTATIONS AND ARTIFICIAL LIMBS TO APPEAR IN THIS COLUMN. WHEN COMPLETED, THIS SERIES WILL BE PUBLISHED IN THE FORM OF A HANDBOOK ON AMPUTATIONS. THE COUNCIL WISHES TO EXPRESS ITS APPRECIATION FOR THE COOPERATION OF ITS GROUP OF CONSULTANTS ON ARTIFICIAL LIMBS. THE COUNCIL IS REPRESENTED BY DRS. FRANK D. DICKSON, HARRY E. MOCK, FRANK R. OBER, S. PERRY ROGERS, PAUL STEELE AND PHILIP WILSON, AND THE ASSOCIATION OF LIMB MANUFACTURERS OF AMERICA IS REPRESENTED BY MESSRS. MCCARTHY HANGER SR., W. E. ISLE, JOSEPH A. SPIEVAK, DAVID E. STOLPE AND J. B. KORRADY.

HOWARD A. CARTER, Secretary.

CHAPTER I. PSYCHOLOGIC AND PHYSIOLOGIC PRINCIPLES IN AMPUTATIONS

1. PSYCHOLOGIC FACTORS

The emotional reactions of patients subjected to amputation fall into three general groups, which correspond to the three main surgical indications for the operation.

The first group embraces those in whom an amputation is performed as an immediate result of an accidental injury. The patient, who has been previously well, active and physically whole, is suddenly confronted by the prospect of going through life maimed. His emotional shock is increased by the uncertainty of this prospect, by his ignorance of the amount of functional disability and disfigurement which his amputation will entail. The rapidity and completeness with which he adjusts himself to this situation will depend largely on his inherent emotional stability, but he can be assisted greatly in this adjustment if his physician is aware of the nature of his problem. The physician can be useful only to the extent that he is prepared to be explicit about just what the patient may expect to do with his stump and a good prosthesis. Emotional equilibrium is regained with a definite assurance of satisfactory appearance and function. As with all physically handicapped persons, harm is done by an excess of sympathy and coddling. The patient will regain his self respect and self reliance more rapidly if such an attitude is apparently expected by those about him.

The second group of patients embraces all those in whom amputation is performed because of chronic disease in the extremity, usually malignant tumor, chronic bone infection or vascular insufficiency. The major surgical problem in these cases is usually the saving of life; the creation of a functional stump and the use of a prosthesis are of secondary consideration. The patient is frequently seriously ill, feeble or debilitated. He is more or less resigned to ill health and incapacity. The loss of a physical member is not such an emotional shock as in the previous group. If his spirit is not completely broken he is likely to welcome any sort of prosthesis, however slight its esthetic or functional value, as a blessed improvement over his former state. However, even in amputations performed as life-saving emergencies, the foresighted surgeon can often create a useful stump at no additional surgical risk. The psychologic advantage to the patient should be sufficient incentive to such forethought whenever possible.

The third great group, and one which should possibly be larger, comprises those patients in whom amputation is performed in a deliberate effort to substitute a useful prosthesis for a useless, unsightly or hopelessly deformed extremity. The psychology of these patients is usually the antithesis of those in the first group. The

patient is frequently aware of the esthetic and functional possibilities and demands the amputation. The surgeon becomes the arbiter in this situation, and his judgment can be sound only if he is thoroughly familiar with the physiologic requirements for successful amputation stumps at all levels and if he is reasonably well acquainted with the types of prosthesis available. One patient must be persuaded to give up a part of his natural body, and the enthusiasm of another must be tempered by a credible explanation of the limitations imposed by his particular deformity. Once such a patient and his surgeon agree on amputation, however, the emotional attitude of the patient is always most favorable. Fortunately for the surgeon, such operations of election can be carefully planned, the leg-maker can be consulted, and the best functional type of amputation should therefore be obtained in every case. The personality change and the physical and spiritual regeneration of the patient delivered from a useless and disfiguring extremity and started afresh with a good prosthesis are among the most gratifying phenomena a surgeon is privileged to observe.

Patients from all three classes tend to have certain reactions in common as time goes on. Once the emotional adjustment to their physical loss is made, they settle down to make the most of life with a prosthesis. The shorter the period between amputation and prosthesis, incidentally, the easier the adjustment is likely to be. During the period of waiting and during the selection and manufacture of the prosthesis, the interest of the patient is likely to be centered on appearance. A shapely limb and a flesh-colored finish seem very attractive. Only after weeks or months of trial do the number and disposition of controlling straps, the shape and character of the socket, and the weight and balance of the prosthesis become important. Gratitude to the surgeon who has planned intelligently for function then begins to stir. The emotionally balanced patient always swings from the question of "How do I look?" to "What can I do?" If his stump and prosthesis are both designed for function, he does very well. He rapidly ceases to regard himself as abnormal in any way, he engages in as many physical activities as his individual disability will permit, and his family and friends soon forget that he is maimed.

2. PHYSIOLOGIC FACTORS

The physiologic functions of the upper extremity are complex. The finely coordinated movements of grasping, pushing, pulling and turning are exceedingly difficult to duplicate in mechanical apparatus. A gloved nonmechanical hand, made of wood, rubber or felt, may be worn for appearance only. Several types of mechanical hands are available in which the fingers or thumb, or both, are actuated by cords from a shoulder harness. The harness is usually arranged so that simple extension of the stump within its socket opens the fingers, which are closed by spring tension, and locked in different positions by an automatic ratchet. Various types of hooks, pliers and tool holders designed for manual labor are actuated in the same manner. Such apparatus requires of the stump only that it be actively movable, long enough to be grasped, and insensitive enough to exert leverage. Duplication of the more complex functions is approached only on the cineplastic amputations, in which skin-lined tunnels through the contractile bellies of antagonistic muscles are used to control complex motions of a mechanical hand. However, the function of cineplastic amputations is limited by the strength of the muscles available, by the durability

of the tunnels and by the mechanical difficulties in manufacturing and fitting the appliances.

Substitution in the lower extremity is more successful because its functions are less complex. Its primary function is weight bearing. The requirements for a successful carrying out of this function in a stump may be inferred from an examination of the anatomy of parts of the body normally subjected to weight bearing. The heel, the front of the knee, the ischial tuberosity and the olecranon of the ulna are examples. The structure of the bone at these points is similar to that beneath the articular surfaces of joints, which are likewise pressure bearing areas. Such bone is always of the finely trabeculated cancellous variety, surrounded by only a thin cortex. Pressure is nowhere borne on tubular bone with its heavy cortex and open medullary canal. Pressure bearing bone is covered with either articular cartilage or a thin, adherent periosteum. The tendinous origins and insertions of muscles are found at most of these locations, and they withstand outside pressure well. The bellies of muscles are never subjected to pressure under normal conditions. If fascia is present it is adherent, never gliding. A minimum of areolar tissue and little or no fat are present. Even the skin over such points has characteristics in common. Both corium and epidermis are thicker, sebaceous glands are more scarce and sudoriferous glands are more plentiful. Furthermore, the specialized character of the skin in weight bearing areas is a congenital affair. Skin from other surface areas when subjected to pressure undergoes a certain amount of adaptation but never a true metamorphosis. Finally, skin subjected to pressure is not subjected to tension; the tension of muscular contractions and bone growth is taken up by the attachment of fascia and tendons to bone.

The second major function of the lower extremity is locomotion. Locomotion in an amputation stump depends on the mobility and the stability of the remaining joints and on the integrity of the neuromuscular apparatus. A muscle can exert no dynamic function in a stump unless, first, its normal length is preserved, second, its origin and insertion are both attached to bone, and, third, its course crosses a movable joint. The death of muscle left without function is a prominent cause of atrophy in an amputation stump.

Both major functions of the lower extremity are dependent on the relative absence of pain. Pain is frequently the major cause of limp. Any patient of normal mentality can learn to walk gracefully on a stump which he can move and on which he can bear weight without pain. But pain from external pressure, pain within the stump from any cause, or the pain of fatigue preclude satisfactory function following any amputation.

Certain mechanical factors are also fundamental. Weight bearing means pressure on a horizontal body surface; that is, one at right angles to the force of gravity. An oblique surface is capable of weight bearing only as its plane approaches the horizontal. As its plane approaches the vertical, the amount of surface pressure required to exert one unit of downward force increases according to geometric law. A corollary to this proposition is that the larger the horizontal surface the less pressure per square unit of area is required to support a given weight. The mechanical requirements for locomotion are just as simple. Motion of a stump can be transmitted to a prosthesis only if effective leverage is available through surfaces that can withstand lateral pressure. And, finally, locomotion requires that the prosthesis be lifted and turned as well as propelled.

Council on Pharmacy and Chemistry

PRELIMINARY REPORT OF THE COUNCIL

THE COUNCIL HAS AUTHORIZED PUBLICATION OF THE FOLLOWING PRELIMINARY REPORT.

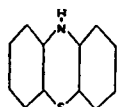
BECAUSE OF RECENT INTEREST SHOWN IN THE EXPERIMENTAL WORK ON PHENOTHIAZINE AS A PARASITICIDE AND AS AN ANTIBACTERIAL AGENT, IT IS EXPECTED THAT THE MEDICAL PROFESSION MAY SHORTLY NEED MORE INFORMATION ON PHENOTHIAZINE OR ITS DERIVATIVES. THERE HAS ALREADY BEEN PUBLISHED IN THE JOURNAL A REPORT ON A SERIES OF CASES OF DERMATITIS FOLLOWING EXPOSURE TO PHENOTHIAZINE AS AN AGRICULTURAL SPRAY. ACCORDINGLY, A PRELIMINARY REPORT ON THE PRESENT STATUS OF PHENOTHIAZINE HAS BEEN PREPARED. THIS PREPARATION IS IN THE EXPERIMENTAL STAGE FOR HUMAN USE.

PAUL NICHOLAS LEECH, Secretary.

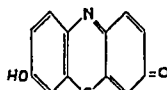
PHENOTHIAZINE

Phenothiazine is the parent substance of a large number of dyes, three of which are the thiazine dyes thionol, Lauth's violet and methylene blue. In 1935 Smith and his co-workers¹ reported an original piece of research on the value of phenothiazine as an insecticide. A substance that is of high toxicity to insects and of low toxicity to warm-blooded animals has long been sought by the U. S. Department of Agriculture² and it was believed that a promising substance had been found in this new agent. Further work led to a number of other practical uses, one of the most important being the treatment of some worm infestations of cattle, sheep, swine and horses and the control of mosquito larvae in ponds. More recent work³ has revealed the substance to be effective in the treatment of certain cases of urinary tract infections.

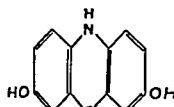
Phenothiazine is prepared from diphenylamine and sulfur. Phenothiazine, thionol and leukothionol (two excretion products) have the following structural formulas respectively:



Phenothiazine.



Thionol.



Leukothionol.

Phenothiazine is distantly related to sulfanilamide. It is a fine pale yellow powder with practically no taste, and it is almost insoluble in water. Exposure to air and moisture causes a slow spontaneous oxidation in which lies its value as both an insecticide and a fungicide. In its original form phenothiazine is effective as an insecticide, but in oxidation it is changed to phenothiazone, in which form it is active as a fungicide.³ The amount present in apple-spray residues may be estimated by a colorimetric method⁴ which is based on the conversion of phenothiazine to a highly colored red compound.

The effectiveness of phenothiazine as a urinary bactericidal agent was discovered when it was noticed that the urine of animals receiving the drug turned red on exposure to air and that on standing for considerable time the urine did not develop the usual disagreeable odor.⁵ Subsequent examinations revealed lack of gross evidence of bacterial growth in the urine⁶ after standing exposed for several weeks.

Preliminary tests were then made of the urine of phenothiazine fed rats on cultures of *Escherichia coli*. Sufficient retardation of growth occurred to warrant further investigation in rabbits.⁶ No toxic effects were observed and one of the authors administered the drug to himself and collected several specimens of urine at varying intervals of time. The urine again was shown to have an antiseptic action on *Escherichia coli*.

Experimental cystitis was produced in male rabbits, phenothiazine given, and its effect noted on the infection. Bacteriologic examination of the urine resulted in sufficient encouragement to warrant further trials by increasing the acidity of the urine and conducting tests on human beings known to have urinary tract infections.³

In the treatment of thirty-one patients with chronic and sixteen with acute infections of the urinary tract, DeEds, Stockton and Thomas³ used phenothiazine in average daily doses of 1.33 Gm. for an average of 7.4 days. Ten patients with infections were permanently relieved of symptoms, and pus and bacteria disappeared from the urine. Cystoscopic examination revealed an increased bladder capacity and decreased hyperemia. Five patients with chronic inflammation were cured and twenty were improved. Only eight of the forty-nine patients failed to secure relief from symptoms if the urine was kept sufficiently acid (p_H 4.5 to 5.5). No undesirable effects could be demonstrated in the gastrointestinal tract, circulation, kidneys or liver. Anemia occurred in three cases after an average total dose of 23.3 Gm., which is far beyond the usual therapeutic dose. The anemia was apparently hemolytic in nature, since there was an early reticulocyte response and a rapid regeneration of the blood. Previous experiments on albino rats⁵ had shown that continued feeding fails to cause any demonstrable tissue injury except in very large doses in which retardation of body growth occurred. The bactericidal properties of phenothiazine are due⁶ to its being excreted in urine partly as the original compound, partly as thionol and its leuco base, and partly as leuco thionol in loose chemical combination. On hydrolysis in sufficiently acid urine free leuco thionol is obtained⁷ which in turn is oxidized to thionol, the true antibacterial agent.

The possibility of the value of phenothiazine as an agent to combat human trichinosis was evolved with the report⁸ that its continuous use over a period of six weeks reduced the severity of trichinosis in rats by 74 per cent. However, a later report⁹ by the same authors asserted that no evidence was found to show phenothiazine to be of any value in experimental trichinosis in rats.

More recently a communication appeared in THE JOURNAL¹⁰ describing patients complaining of skin irritation following the use of phenothiazine while using the material as a spray. Because of failure to obtain similar reactions by men working in laboratories, an investigation was made. It was found that the reactions were due to the excretion of the reversible oxidation-reduction system thionol-leukothionol previously reported.¹¹ Leukothionol is photosensitive and is oxidized to thionol when exposed to sunlight under anaerobic conditions. It was suggested, then, that the reactions were due to photosensitization and not to local irritation by phenothiazine.

It is understood that a number of pharmaceutical houses have distributed phenothiazine for investigational use. The product appears to have unusual properties both as a urinary bactericidal agent and as a possible treatment for worm infestations. Although the product is still in the experimental stage as regards therapeutic use, because of these unusual properties it is almost certain to obtain much attention in the near future. It is of more than academic interest, in that the material is also used as a spray in agricultural industry and has been shown to be the cause of cutaneous reactions.

The preparation is one which has interesting possibilities; there is lacking sufficient evidence both from the chemical point of view and from that of clinical research to justify general use by the medical profession at this time. In view of the experimental nature of the drug the Council suggests that further investigations with adequate controls will be useful for a proper evaluation of the therapeutic possibilities of phenothiazine.

1. Smith, L. E.; Munger, F. G., and Siegler, E. H.: Phenothiazine, a Promising New Insecticide, *J. Econ. Entomol.* **28**: 727, 1935.

2. Press Release from the U. S. Dept. of Agriculture entitled "Expanding New Uses for Drug Toxic to Insects but Noninjurious to Animals," Feb. 11, 1940.

3. DeEds, Floyd; Stockton, A. B., and Thomas, J. O.: Studies on Phenothiazine: VIII. Antiseptic Value of Phenothiazine in Urinary Tract Infections, *J. Pharmacol. & Exper. Therap.* **65**: 353 (April) 1939.

4. Eddy, P. W., and DeEds, Floyd: Studies on Phenothiazine: I. A Colorimetric Method for Estimation of Phenothiazine, *Food Research* **2**: 305, 1937.

5. Eddy, P. W.; Coe, A. J., and DeEds, Floyd: Studies on Phenothiazine: II. Continued Feeding Phenothiazine, *J. Indust. Hyg. & Toxicol.* **19**: 574 (Dec.) 1937.

6. Thomas, J. O.; DeEds, Floyd, and Eddy, P. W.: Studies on Phenothiazine: VII. The Bactericidal Properties of Urine After Oral Administration of Phenothiazine, *J. Pharmacol. & Exper. Therap.* **64**: 280 (Nov.) 1938.

7. DeEds, Floyd; Eddy, P. W., and Thomas, J. O.: Studies on Phenothiazine: V. Fate of Phenothiazine in the Body, *J. Pharmacol. & Exper. Therap.* **64**: 250 (Nov.) 1938.

8. McNaught, J. B.; Beard, R. R., and DeEds, Floyd: Effects of Sulfanilamide, Phenothiazine and Thionol in Experimental Trichinosis, *Proc. Soc. Exper. Biol. & Med.* **41**: 17 (May) 1939.

9. McNaught, J. B.; Beard, R. R., and DeEds, Floyd: Further Observations of Phenothiazine in Experimental Trichinosis, *Proc. Soc. Exper. Biol. & Med.* **42**: 645 (Nov.) 1939.

10. DeEds, Floyd; Wilson, R. H., and Thomas, J. O.: Photosensitization by Phenothiazine, *J. A. M. A.* **114**: 2095 (May 25) 1940.

11. DeEds, Floyd, and Eddy, C. W.: Studies on Phenothiazine: IV. Potentiation Characterization of Thionol, *J. Am. Chem. Soc.* **60**: 2079, 1938.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, NOVEMBER 16, 1940

THE PLATFORM OF THE AMERICAN MEDICAL ASSOCIATION

The American Medical Association advocates:

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.
2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.
3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.
4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.
5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.
6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.
7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.
8. Expansion of public health and medical services consistent with the American system of democracy.

PUBLIC HEALTH AND THE MEDICAL PROFESSION

Public health in the United States has been one of the most important contributions of organized medicine to the public welfare. When the American Medical Association was organized in 1847 there were no state health departments and few city health departments. In many instances "the local medical societies took an active interest in instituting measures for the protection of their communities against pestilential disease and in some localities attended to this work without any form of health organization" (Rise and Fall of Disease in Illinois).

At the first meeting of the American Medical Association in 1847, matters pertaining to hygiene and sanitation were leading subjects. Even the preliminary meeting in 1846 urged "upon the several state governments the adoption of measures for a registration of births, marriages and deaths." Such vital statistics

are an important feature of every modern health department. In 1848 the Committee on Public Hygiene of the American Medical Association expressed the hope, in its first report, "that the day is not far distant when a town without sewerage will be unknown in the United States." At the Association's meeting in 1849, it was emphasized, "pure water, like pure air, is so essential a requisite that its presence is absolutely necessary to preserve human life." The abatement of nuisances was also discussed at this meeting, for "the necessity for the removal of the refuse which is constantly accumulating in streets is . . . obvious." Present day health departments employ competent sanitary engineers for the control of these problems.

Epidemiology and communicable disease control were not neglected. In 1853, in the absence of health departments, it was "resolved, that the Association earnestly recommend to the local societies in different portions of our country to appoint committees, whose duties it shall be to record the prevalence of epidemics or other diseases." The next year it is found that the delegates "demand the speedy enactment of further and more stringent quarantine laws to prevent the spread of infectious disease."

These few citations from the records of the American Medical Association could be multiplied many times, showing the attitude of the medical profession to public health. They served to stimulate physicians in the different states to form state health departments. The first state health department to be established was that of Massachusetts, organized in 1869 after thirty years of endeavor by the medical profession. In 1861 it was

Resolved, That the Massachusetts Medical Society petition the Legislature to grant the petition . . . for a State Board of Health . . .

That every member of the Medical Society be requested to use his influence . . . to support this measure in the Legislature.

California in 1870 was the second state to establish a state board of health, under the guidance of leaders in the state medical society. The Medical Society of Virginia, reorganized in 1871 after the Civil War, at its first meeting petitioned the state legislature to establish a state board of health, which was done in that year. Thus the record goes for state after state. In Alabama the state medical association agitated the problem of a state board of health for several years, until in 1875 the Alabama general assembly passed a law designating the Alabama State Medical Association as the state board of health and county medical societies affiliated with the association as boards of health in their respective counties. In 1874 the Tennessee State Medical Society prepared and presented to the legislature a bill providing for the establishment of a state board of health. In 1875 this failed to pass; in 1877 it was passed but the appropriation was stricken out. In 1876 the Illinois State Medical Society felt that "a board of health organized and provided with the means to collect information, and diffuse among the people

a better knowledge of the laws of health, and to discover to them the dangers to which they are exposed, would save thousands of poor victims from untimely death."

Scarcely any state health departments and few city health departments exist that do not owe their origin to the activities of state and local medical societies. The years have not decreased the active interest of medicine in public health work. True, honest differences of opinion have arisen at times in the administration of public health activities (as they have arisen in other government functions); unfortunately some self-promoting opportunists have seized these occasions to make it appear that medical organizations are opposed to public health activities.

Among the officers, the Board of Trustees and members of the House of Delegates of the American Medical Association are members of state and city boards of health. In these capacities they have been active in helping to frame the policies of the Association. Even as lately as 1938 the House of Delegates of the American Medical Association at a special session emphasized the desirability of "the strengthening and expansion of recognized public health service in states and local communities." Here is no opposition or enmity for public health. The honest differences of opinion which do exist have been centered definitely on the extent to which public health officialdom shall depart from its primary function of prevention of disease and take over the practice of medicine.

SULFANILAMIDE IN THE LOCAL TREATMENT OF WOUNDS

The precise mechanism of the specific chemotherapeutic action of sulfanilamide on bacteria has not been conclusively elucidated. Colbrook, Bliss and Long, Lockwood and others demonstrated that the drug has a bacteriostatic action *in vitro* on hemolytic streptococci, staphylococci, pneumococci and colon bacilli. The extent of this action, however, as pointed out by Fleming and by Lockwood and Lynch, depends on the concentration of the drug and on the concentration of peptones in the culture medium. The action of the drug in a wound may be modified by a number of factors. Destruction of tissue results in the breakdown of protein with formation of peptone, and the presence of peptone inhibits the bacteriostatic action of sulfanilamide.

Jensen, Johnsrud and Nelson¹ produced experimental open fractures of ribs in a series of twenty-seven guinea pigs. The wounds were flooded with a culture of a virulent strain of *Staphylococcus aureus* and were sutured. In a control series 71.4 per cent became infected, while in the series in which 0.5 Gm. of sulfanilamide was placed in the wound only 20 per cent became infected. In a series in which 0.5 Gm. of sulfanilamide was placed beneath the skin of the abdo-

men 80 per cent became infected, demonstrating the inferiority of the systemic action of sulfanilamide. At the Minneapolis General Hospital the same authors treated thirty-nine compound fractures and two compound dislocations by placing crystalline sulfanilamide into the wounds after completion of meticulous débridement. The wounds were closed by interrupted silk sutures to the skin only. Complete reduction of the fracture was accomplished at the time of débridement, and absolute immobility by immediate application of unpadded plaster splints. All of the wounds healed by primary intention. Ninety-four compound fractures treated at the same hospital by similar methods, except that sulfanilamide was not used, showed 27 per cent infection, seven cases of gangrene and five amputations to control infection. The authors explain these truly striking results by the fact that, while systemic administration of sulfanilamide aims to produce a concentration of from 10 to 15 mg. per hundred cubic centimeters in the blood and tissue fluids, the local implantation produces a concentration of about 800 mg. per hundred cubic centimeters in the contaminated area and maintains this concentration over a period of about thirty-six hours. Thus the local implantation of sulfanilamide appears to be a highly efficient method of preventing and combating infection in compound fractures. The method is rapidly becoming the most important addition to the treatment of wounds of the type most frequently met in industrial surgery and in military surgery and is being rapidly adopted in surgical practice here and in England. Key and Burford² investigated in animal experiments the question of whether or not the local implantation of sulfanilamide in a compound fracture inhibits healing of the bones. They produced bilateral symmetrical fractures in one bone of each foreleg in a series of fifteen rabbits. The wound in the right foreleg was packed with crystals of sulfanilamide; the fracture in the left foreleg served as a control. Roentgenographic and microscopic studies failed to reveal any differences in the formation of callus on the two sides. From their clinical as well as experimental observations they conclude that the local implantation of sulfanilamide crystals in compound fractures not only tends to lessen the danger of infection but also does not perceptibly interfere with the union of the soft tissues or of the bone.

Mayo and Miller³ report on the local use of sulfanilamide in cases after combined abdominoperineal or posterior resections for carcinoma of the rectum. The drug was applied directly to the wound, either by packs saturated with the solution or by direct irrigation of the wound. The solution was prepared by adding sulfanilamide to boiling physiologic solution of sodium chloride (0.8 per cent is the limit of solubility of sulfanilamide). Irrigations with this chemical compound

1. Jensen, N. K.; Johnsrud, Luverne W., and Nelson, M. C.: The Local Implantation of Sulfanilamide in Compound Fractures, *Surgery* 6:1 (July) 1939.

2. Key, J. A., and Burford, T. H.: The Local Implantation of Sulfanilamide in Compound Fractures, *South. M. J.* 33: 449 (May) 1940.

3. Mayo, C. W., and Miller, J. M.: Solution of Sulfanilamide in the Local Treatment of Wounds, *Proc. Staff Meet., Mayo Clin.* 15: 609 (Sept. 25) 1940.

have been effective when other drugs have failed. The wounds were much cleaner in appearance and presented healthy granulation tissue. Herrell and Brown⁴ of the same clinic used a thick suspension by adding 2 Gm. of sulfanilamide to 100 cc. of an 0.8 per cent solution of sulfanilamide in physiologic solution of sodium chloride in the treatment of twenty-one cases of badly infected wounds of the scalp, thorax and pericardium, abdominal incisions and infected sinuses. The results, in their opinion, have been sufficiently encouraging to justify a continuation of this procedure.

"JUG STATION" MILK

In 1932 THE JOURNAL condemned the sale and use of bootleg milk,¹ namely milk offered for sale outside municipal limits and therefore not subject to the regulations governing the sale of milk within the municipality. Several health officers at that time were confronted with the health hazard developed by the sale of milk at roadside stands to residents of nearby cities. Such milk was cheaper than milk sold in the city. Often it came from farms of such insanitary condition that their product could not be offered within the city limits.

Studies by the United States Public Health Service and the former American Child Health Association have demonstrated again and again that milk-borne epidemics are due almost exclusively to raw milk supplies.² In many parts of this country, especially the smaller cities, raw milk still constitutes an appreciable percentage of the daily milk distribution. Raw milk unless certified is frequently produced under conditions not conducive to safety. The danger of contamination of raw milk has been recognized even to the extent that producers of certified milk and the American Association of Medical Milk Commissions, which supervises certified milk production, are agreed that pasteurization would be an additional safeguard even for certified milk.³

The sale of raw milk continues in spite of the fact that pasteurized milk is safer. Certainly there is no established evidence to indicate that raw milk is any more desirable nutritionally than pasteurized milk. The Council on Foods and Nutrition of the American Medical Association has published the following decision concerning the relative nutritional values of raw and of pasteurized milk:

Milk is an excellent medium for many dangerous bacteria as well as an excellent food for man. Disease germs may enter the milk directly from an ailing cow, be introduced by insects, or be transferred to the milk by the fingers or mouth-

spray of persons having to do with the collection or transportation of milk. . . .

The pasteurization of milk is a public health measure. The public should demand pasteurized milk for drinking and the use of pasteurized milk in milk products. The dairy trade should universally adopt pasteurization in the interest of public health.

There is no cogent evidence that pasteurized milk is significantly inferior nutritionally to raw milk.

Even today bootleg milk stations, also called "jug stations," still operate outside the corporate limits and consequently outside the jurisdiction of some cities in which only pasteurized milk, other than certified, is legal. When every possible legal precaution has been taken to protect a community against potential dangers in raw milk, and milk consumers persist in circumventing the local regulations by buying milk from unsupervised sources, the occurrence of milk-borne outbreaks of communicable disease cannot be attributed to any failure on the part of the health authorities. Unless county and state authorities cooperate with city health officials in controlling this menace to health, outbreaks of milk-borne infection are bound to occur.

Current Comment

ORGANIZATION OF MEDICINE AND MILITARY SERVICES

As our nation begins to mobilize for efficient defense against any type of aggression, the medical profession is called on increasingly for the specialized service which only medicine can render. The pages of THE JOURNAL have been reflecting these activities increasingly in recent weeks. It is trite to say that medicine has advanced more greatly in the past fifty years than in all the previous centuries of the life of man. It has, moreover, become even more specialized in the twenty years that have passed since the last war than in the twenty years previously. The increasing specialization in medical service has introduced into medical practice innumerable technicians of considerable variety. The technical branches associated with medical care include physical therapists, roentgenologists, clinical pathology technicians, lay anesthetists and dental hygienists, as well as the vast personnel of the hospital, including the record librarians, the dietitians, the hospital librarians, makers of splints and braces, and other similar workers. Moreover, there are vocations associated with medicine which do not involve complete medical training but which have in many places legal recognition. Thus there are masseurs who are essentially physical trainers or rubbers rather than physical therapists. There are podiatrists who in some instances, under medical supervision, are helpful in the treatment of lesions of the soft tissues of the feet. In addition there are osteopaths, chiropractors, naturopaths and others who claim to have training and ability to treat human diseases and abnormalities. In the evolution of the medical services associated with military establishments recognition has been sought by many of these agencies, and attempts have been made to develop suit-

4. Herrell, W. E., and Brown, A. E.: Local Use of Sulfamido Compounds in the Treatment of Infected Wounds, Proc. Staff Meet., Mayo Clin. 15: 611 (Sept. 25) 1940.

1. Bootleg Milk, editorial, J. A. M. A. 99: 1606 (Nov. 5) 1932.

2. Frank, L. C.; Clark, F. A.; Haskell, W. H.; Miller, M. M.; Moss, F. J., and Thomas, R. C.: Do Children Who Drink Raw Milk Thrive Better than Children Who Drink Heated Milk? Pub. Health Rep. 47: 1941 (Sept. 23) 1932. Crumbine, S. J.: Report on Milk-Borne Epidemic Diseases in the United States and Canada, 1924 to 1933, Am. Child Health A. Bulletin, July 1934.

3. Pasteurization of Certified Milk, editorial, J. A. M. A. 105: 601 Aug. 24, 1935.

able rank and advancement for workers in every one of these fields. Some of these movements have gone to the point of proposed legislation, and attempts have been made to secure official status for workers in some of these fields which would carry them not only to the ranks available in the lower grades of the medical corps, but even to lieutenantancy, captaincy and colonelcy. In military organizations each rank provides a certain income with certain command or professional responsibilities. Physicians, dentists and veterinarians have rank commensurate with their responsibilities. It would be most unfortunate if members of a technical group that may be of assistance to the medical profession in a subordinate capacity should be advanced by law in military service to rank granting them not only equality but actual supervision over highly trained physicians and surgeons. Unfortunately, in their desire for advancement, several of those engaged in the technical branches that have been mentioned have urged the aid of physicians in their campaign for legislation. The doctors will do well to avoid such entangling alliances and avoid participation in such movements unless they are completely aware of what the ultimate effect might be on the medical profession, and particularly on that part of it in the military service.

LACK OF PROVITAMIN A IN FLOUR

A small amount of yellow coloring matter is naturally present in wheat. This pigment formerly was considered to be largely, if not entirely, carotene. Because the coloring material is completely destroyed by the bleaching process to which much white flour is subjected, the question naturally has arisen whether such bleaching does not materially impair the nutritive value of the flour because of the destruction of carotene, which is provitamin A. The older reports in the scientific literature have indicated that such might be the case. Drummond and Wilbraham,¹ in their essays on diet, have compared the carotene content of unbleached and bleached white flour. A review of the available evidence led these authors to conclude that unbleached flour may contain as much as 0.2 Gm. of carotene to each hundred grams, whereas the carotene content of bleached flour is nil. The Council on Foods and Nutrition has also reviewed the evidence on the alleged carotene content of flour.² The Council has calculated that a pound loaf of bread made from unbleached flour may furnish from 0.6 to 1.2 mg. of carotene, which would be equivalent to from 1,000 to 2,000 U. S. P. units of vitamin A or roughly about one half the daily requirements for an adult. These calculations, of course, were made on the assumption that the reported values of the carotene content of wheat and its various products are substantially correct. Not many bio-assays of wheat or its products have been reported, but these have shown the vitamin A value to be small. It now appears from a recent investigation by Zechmeister and Chohnoky³ that the natural pigment of wheat largely consists of

xanthophyll, a yellow coloring material related to carotene but having no vitamin A activity. Small quantities of crystalline xanthophyll have been isolated from flour. By means of chromatographic experiments these authors found that the unbleached flours which they examined are almost completely free of carotene. Because cryptoxanthine is also absent, they conclude that flour is valueless as a source of provitamin A. The determinations were made on Hungarian wheat flour. It would be well to repeat the experiments with the new technic on various milling fractions of wheat as well as grain from different localities. Until evidence to the contrary is obtained, however, it would be proper to consider both bleached and unbleached flour as meritorious foods but devoid of or insignificant as sources of vitamin A activity.

ARMOR IN MODERN WARFARE

At the time of the last war many wounds and injuries from projectiles and bomb fragments could have been avoided with the use of suitable protective devices for the body—helmets and armor—and this is true perhaps to an even greater degree in the present war. Apparently most of the armed services in different countries have recognized this problem and are studying it and making experiments. The major technical considerations are the speed of the projectile against which protection is most necessary, the regions of the body most vulnerable and most vital and the weight and composition of the armored material. One of the principal students of this subject has been Mr. Kenneth Walker of London, who among his other contributions to this discussion maintains that by restricting protection to certain areas of the body it is possible to employ armor of a weight which will protect from missiles of even high velocity (2,600 feet per second—the velocity of a machine gun bullet fired at close range). The problems are complex but Mr. Walker has also pointed out that, if anything is achieved along the lines of better armored protection, the initiative must come from the medical profession.

BUILDING HOSPITALS

The impression prevails and in certain circles is widely promoted that hospital construction has halted during the depression. True, many of the sources from which income for hospital building is drawn in prosperous times have lessened their flow. However, the WPA in a "Report of Work Completed, 1935-1940" relates that during this period 132 new hospitals have been constructed, 1,592 have been reconstructed or improved and additions have been made to 222. Up to June 1939 the PWA in its report "America Builds," page 143, states that "PWA has provided 121,760 beds in hospitals costing \$367,659,880." The technical committee which reported to the National Health Conference, and from which report much of the impression has proceeded, estimated that a normal increase in hospital beds should be 25,000 a year. Since the PWA alone provided 121,760 beds in five years, it should be evident that the alarm of the National Health Conference with regard to hospital construction is somewhat lacking in justification.

1. Drummond, J. C., and Wilbraham, Anne: *The Englishman's Food, A History of Five Centuries of English Diet*, London, Jonathan Cape, 1939.

2. Accepted Foods and Their Nutritional Significance, Council on Foods of the American Medical Association, 1939, p. 102.

3. Zechmeister, L., and Chohnoky, L.: Carotenoids of Hungarian Wheat Flour, *J. Biol. Chem.* 135: 31 (Aug.) 1940.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

PHYSICAL REQUIREMENTS THE SAME FOR ALL WHO ENLIST OR ARE INDUCTED INTO ARMY

The War Department has announced that the same procedure in physical examination and the same standards of physical requirements prescribed for Class 1-A registrants will be used for the physical examination of (1) men enlisted or reenlisted in the Regular Army, (2) men enlisted or reenlisted in the National Guard, (3) enlisted men of the National Guard inducted into federal service, (4) men enlisted in the Army of the United States, (5) men inducted into the Army under the Selective Training and Service Act of 1940. Examinations will be conducted with the utmost care in order that no individual who is unfit for military service will be accepted. Examining physicians will consider the standards set forth in the regulations as a guide to their discretion rather than construe them too strictly or arbitrarily.

The standards in the new regulations apply only to applicants for enlistment or induction into the Army of the United States. Physical requirements for all other personnel (candidates for commission in the Army or the Air Corps, candidates for appointment as Army nurses, warrant officers and candidates for the United States Military Academy) are defined in other army regulations.

Examinees will be classified into three categories in accordance with the conclusions of the medical officers conducting the physical examination:

Class 1-A: Those physically qualified for general active military service.

Class 1-B: Those who are physically unfit for general active military service but are fit for special and limited military service.

(Registrants who fail to qualify for Class 1-A and who do not fall below Class 1-B in any phase of the examination will be placed in Class 1-B unless because of multiple defects the medical examiners recommend unqualified rejection and placement in Class 4. Men placed in Class 1-B will not be accepted unless specific directions to that effect are issued by the War Department.)

Class 4: Those physically unfit for any military service. (All registrants who do not meet the physical requirements of Class 1-A or Class 1-B will be placed in Class 4.)

No applicant will be accepted for enlistment or induction who does not meet the standards prescribed for vision and hearing or who suffers from toxic conditions associated with abnormal conditions of the ductless glands, from valvular disease of the heart, from tuberculosis, from communicable diseases, from mental disease or deficiency, from insufficient teeth or from irremediable defects of the feet. Medical examiners will reject all men in need of hospitalization and all

those who by reason of physical defects are considered unfit for early participation in training activities.

Whenever it appears to an examining physician that a registrant is endeavoring to escape military service by malingering, if he is otherwise mentally and physically fit the registrant will be accepted for military service.

PHYSICAL STANDARDS UNDER SELECTIVE SERVICE

On October 18 the physical standards under the Selective Service, which were published in THE JOURNAL November 2, were modified by a special circular issued by the chief of staff which has just become available. According to this special circular, which modifies physical standards not only for men selected under the Selective Service but for enlisted men as well, the presence of malaria, uncinariasis and remediable incapacity due to recent acute illness or injury or to employment or environment in civil life will not be considered as permitting the man to be placed in Class 1-A and as suitable for military service. Moreover, the section on "Genito-Urinary Organs and Venereal Diseases," which appeared on page 1557, is to be modified by the elimination of the classifications "Gonorrhea, acute or chronic," "Syphilis with remediable manifestations except cerebrospinal, cardiovascular or visceral syphilis" and "Chancroids and the resulting infections of the lymph glands of the groin." This, however, is still further modified by a telegram which was received last week from Mr. Dykstra indicating that two positive Wassermann tests or any venereal disease would be considered as causes for rejection.

Under the heading "Endocrine and Metabolic Disorders," which appeared on page 1558, the heading under Class 1-A *e* is to be eliminated, i. e. pellagra, beriberi, scurvy and other nutritional deficiencies, if remediable by correction of diet and not severe, will no longer be considered as conditions which would qualify for general military service.

Finally, under the heading of "Diseases of the Blood and Blood-Forming Tissues," all the items listed under 1-A are eliminated so that no longer can secondary anemia, purpura, sickle cell anemia or malaria be considered as conditions which would qualify for general military service.

These deletions are explained in the circular No. 117, which was issued on October 18, in the following paragraph: "The defects noted in the deleted paragraphs will be regarded as causes for rejection by Army medical examiners until there has been recovery without disqualifying sequelae. Medical examiners will reject all men who are in need of hospitalization, and all those who by reason of physical defects are considered unfit for early participation in training activities."

This is in accord with the expressed statement that the purpose of the Selective Service is to secure men physically fit for military training at the time of examination and not primarily to rehabilitate those who are

found to be unfit. No doubt, however, every encouragement will be given to those who are unfit to seek recovery from the conditions for which they are rejected so as to be available subsequently.

RESERVE OFFICERS ORDERED TO ACTIVE DUTY

ARMY—SECOND CORPS AREA

Following is a list of the medical reserve officers with grade, permanent address and military area, ordered to active duty by the commanding general, Second Corps Area, up to November 8:

LIPPOLD, William E., Lieut. Col., Brooklyn, 2d.
JOHNSON, Vansel S., Major, New York, 2d.
KASICH, Milosh, Major, New York, 2d.
LYON, Edward C., Major, New York, 2d.
PUGH, Walter S., Major, Utica, N. Y., 1st.
RUSSELL, Lecky H., Major, Elmhurst, L. I., N. Y., 2d.
YELLEN, Hiram S., Major, Buffalo, 1st.
BEERY, Edwin N., Captain, Brooklyn, 2d.
CANTOR, Mortimer J., Captain, Brooklyn, 2d.
DEUTCH, Theodore M., Captain, Brooklyn, 2d.
DISICK, Solomon, Captain, Brooklyn, 2d.
EASTMAN, Harry D., Captain, Albany, 1st.
EDELSTEIN, Isidore S., Captain, Brooklyn, 2d.
FEIGIN, Emanuel V., Captain, New York, 2d.
HERR, Bayard S., Captain, Amsterdam, N. Y., 1st.
KETTLER, George H., Captain, Menands, N. Y., 1st.
KERSTEIN, Louis N., Captain, Rochester, N. Y., 1st.
MAYER, David E., Captain, New York, 2d.
MICHELSON, Henry, Captain, Paterson, N. J., 3d.
NEUWIRTH, Abraham A., Captain, Floral Park, L. I., N. Y., 2d.
NICOLAIS, Michael A., Captain, Trenton, N. J., 3d.
REED, Theodore D., Captain, Amityville, L. I., N. Y., 2d.
ROSENBERG, Albert B., Captain, North Plainfield, N. J., 3d.
SABIN, Anthony G., Captain, Brooklyn, 2d.
SICILIANO, Thomas, Captain, Brooklyn, 2d.
STARK, Jesse D., Captain, New York, 2d.
YACHNIN, Samuel, Captain, Lyndhurst, N. J., 3d.
AMATO, Vincent, 1st Lieut., Astoria, L. I., N. Y., 2d.
BARBANO, Alfred J., 1st Lieut., New Brunswick, N. J., 3d.
BLICK, Michael S., 1st Lieut., New York, 2d.
BLOOM, Bernard, 1st Lieut., Brooklyn, 2d.
BRITT, Richard W., 1st Lieut., Tonawanda, N. Y., 1st.
BRUSSEL, James A., 1st Lieut., Brentwood, L. I., N. Y., 2d.
CHERNUS, Jack, 1st Lieut., Newark, N. J., 3d.
CONANT, Ralph E., 1st Lieut., Kew Gardens, L. I., N. Y., 2d.
CRANE, Timothy F., 1st Lieut., New York, 2d.
CREIGHTON, James J., 1st Lieut., Buffalo, 1st.
DAVOLOS, Joseph J., 1st Lieut., Wilmington, Del., 3d.
DINKIN, Sidney, 1st Lieut., Brooklyn, 2d.
DOBSON, Leslie H., 1st Lieut., Poughkeepsie, N. Y., 2d.
DONALD, Howard A., 1st Lieut., South Ozone Park, N. Y., 2d.
DURHAM, James R., 1st Lieut., Wilmington, Del., 3d.
EBY, Robert E., 1st Lieut., New Rochelle, N. Y., 2d.
FABRICANT, Harry, 1st Lieut., Brooklyn, 2d.
FEIGEN, Gerald M., 1st Lieut., Paterson, N. J., 3d.
GILBERT, Sidney B., 1st Lieut., New York, 2d.
GOLDSTEIN, Joseph D., 1st Lieut., Jersey City, N. J., 3d.
GOLDSTEIN, Solomon, 1st Lieut., Brooklyn, 2d.
GOODWIN, Albert F., 1st Lieut., Schenectady, N. Y., 1st.
GRANT, Raymond J., 1st Lieut., Jersey City, N. J., 3d.
GRAYSON, Morris, 1st Lieut., Ozone Park, L. I., N. Y., 2d.
GREENFIELD, Sylvan J., 1st Lieut., Newark, N. J., 3d.
GROOPMAN, John, 1st Lieut., New York, 2d.
GROSS, Charles N., 1st Lieut., Atlantic City, N. J., 3d.

GUIDOTTI, Frank P., 1st Lieut., Trenton, N. J., 3d.
HALL, Cloyes T., 1st Lieut., Morrisville, N. Y., 1st.
HART, Maurice D., 1st Lieut., St. Albans, L. I., N. Y., 2d.
HARTSTEIN, Edward, 1st Lieut., Brooklyn, 2d.
HAYMAN, Charles R., 1st Lieut., Scarsdale, N. Y., 2d.
HERMAN, Mark L., 1st Lieut., Adams, N. Y., 1st.
HOAK, Frank C., 1st Lieut., Niagara Falls, N. Y., 1st.
HOFFMAN, Sidney, 1st Lieut., Brooklyn, 2d.
HONIGMAN, Morris, 1st Lieut., Brooklyn, 2d.
HOTT, Louis R., 1st Lieut., Brooklyn, 2d.
KAHN, Bernard I., 1st Lieut., Brooklyn, 2d.
KAHN, Kenneth M., 1st Lieut., New York, 2d.
KALLEN, Arnold M., 1st Lieut., Newark, N. J., 3d.
KANENGISER, Clifford, 1st Lieut., Jersey City, N. J., 3d.
KARPEL, Bernard, 1st Lieut., New York, 2d.
KURLAND, Harry A., 1st Lieut., New York, 2d.
KWINT, Joseph A., 1st Lieut., Plainfield, N. J., 3d.
LAMB, Richard R., 1st Lieut., Farmingdale, N. Y., 1st.
LATEINER, Robert, 1st Lieut., New Rochelle, N. Y., 2d.
LABARBERA, Thomas, 1st Lieut., Brooklyn, 2d.
LEHMAN, Ernest, 1st Lieut., Brooklyn, 2d.
LEVINE, Harold N., 1st Lieut., Secaucus, N. J., 3d.
LEVY, Aaron, 1st Lieut., Brooklyn, 2d.
LEWIS, Benjamin, 1st Lieut., New York, 2d.
LEBEL, Irving, 1st Lieut., New York, 2d.
LICCIONE, William J., 1st Lieut., Syracuse, N. Y., 1st.
LIPSCHUTZ, Daniel M., 1st Lieut., New York, 2d.
LORD, William J., 1st Lieut., Albany, N. Y., 1st.
LOWE, Robert H., 1st Lieut., Bronx, N. Y., 2d.
LUCE, Henry A., 1st Lieut., Orange, N. J., 3d.
LUSTIG, Melvin, 1st Lieut., Newark, N. J., 3d.
MANFREDONIA, Charles, 1st Lieut., Brooklyn, 2d.
MARGOLIS, Hyman, 1st Lieut., Brooklyn, 2d.
MARINELLO, Carle J., 1st Lieut., Buffalo, 1st.
MARINO, Benjamin W., 1st Lieut., Brooklyn, 2d.
MARKOWITZ, Harold I., 1st Lieut., Jersey City, N. J., 3d.
McCABE, John A., 1st Lieut., Buffalo, 1st.
METCALF, Frederic U., 1st Lieut., Rockville Centre, N. Y., 2d.
MICELI, John A., 1st Lieut., Brooklyn, 2d.
MILLER, Eugene L., 1st Lieut., Newark, N. J., 3d.
MILLER, Lloyd D., 1st Lieut., Stapleton, N. Y., 1st.
MONALDY, Morris A., 1st Lieut., Clifton, N. J., 3d.
MONTELEONE, Joseph C., 1st Lieut., Brooklyn, 2d.
NAUMOFF, Joseph H., 1st Lieut., Schenectady, N. Y., 1st.
NELSON, Joseph P., 1st Lieut., Brooklyn, 2d.
PADYKULA, Stanley G., 1st Lieut., Endicott, N. Y., 1st.
PASTERNAK, Elroy, 1st Lieut., Passaic, N. J., 3d.
PRUVY, Robert M., 1st Lieut., Yonkers, N. Y., 2d.
RIZZO, Joseph J., 1st Lieut., New York, 2d.
ROBERTS, Arthur J. D., 1st Lieut., Bronx, N. Y., 2d.
ROCCO, Leo C., 1st Lieut., Red Bank, N. J., 3d.
ROSENBLUM, Meyer, 1st Lieut., Brooklyn, 2d.
SESIT, Myron F., 1st Lieut., New York, 2d.
SKURA, George, 1st Lieut., Brooklyn, 2d.
SMALL, Bernard L., 1st Lieut., Lawrence, L. I., N. Y., 2d.
SOLOMON, Saul, 1st Lieut., New York, 2d.
SPINNER, Morton H., 1st Lieut., New York, 2d.
STINSON, Charles L., 1st Lieut., Buffalo, 1st.
TAYLOR, Charles W., 1st Lieut., Kings Park, N. Y., 2d.
WALLER, John V., 1st Lieut., New York, 2d.
ZEMAN, Michael S., 1st Lieut., New York, 2d.

SEVENTH CORPS AREA

Following is the initial report of names with grade, permanent address and active duty station of Medical Corps Reserve officers ordered to extended active duty by the Seventh Corps Area commander up to midnight, November 8:

DALY, John Raymond, Major, Clayton, Mo., The Executive, Third Military Area, St. Louis
SAMUEL, John Maurice, Captain, Little Rock, Ark., Recruiting Officer, U. S. Army, Little Rock, Ark.
BOWERS, Warner Fremont, Captain, Omaha, The Executive, Second Military Area, Omaha
SCHAEFFERS, Richard Henry, 1st Lieut., Omaha, Commanding Officer, Fort Omaha, Neb.
RICHARDSON, Frederick Stuart, Major, Minneapolis, The Executive, First Military Area, Minneapolis.
WHITEHEAD, Robert Homer Jr., 1st Lieut., Camden, Ark., Commanding General, Fort Snelling, Minn.
HIBBERT, Russell William Jr., 1st Lieut., St. Louis, Commanding Officer, Fort Meade, S. D.

BASHAM, Charles Edward, 1st Lieut., Eureka, Kan., Commanding General, Fort Des Moines, Iowa
CODDON, Walter David, Captain, St. Paul, Commanding General, Fort Snelling, Minn.
COUGHLAN, Vernon Henry, Captain, Strawberry Point, Iowa, Commanding General, Fort Snelling, Minn.
EGBERT, Daniel Snell, Captain, Atlantic, Iowa, Commanding General, Fort Snelling, Minn.
BECKJORD, Philip Rains, 1st Lieut., Willmar, Minn., Commanding General, Fort Snelling, Minn.
BRODY, Sidney, 1st Lieut., Ottumwa, Iowa, Commanding General, Fort Snelling, Minn.
ELSWORTH, John Nelson, 1st Lieut., Bismarck, N. D., Commanding General, Fort Snelling, Minn.
FORMAN, Louis Hyman, 1st Lieut., Wichita, Kan., Commanding General, Fort Snelling, Minn.
FROGNER, Lester Sanford, 1st Lieut., Grand Marais, Minn., Commanding General, Fort Snelling, Minn.
HOLT, George Waltherman, 1st Lieut., Wabasha, Minn., Commanding General, Fort Snelling, Minn.
IHLE, Charles William Jr., 1st Lieut., Cleghorn, Iowa, Commanding General, Fort Snelling, Minn.

MILLER, Samuel, 1st Lieut., Ellendale, N. D., Commanding General, Fort Snelling, Minn.
 MOORE, George Ensley, 1st Lieut., Fulton, Mo., Commanding General, Fort Snelling, Minn.
 MORRISON, John Robert, 1st Lieut., Carroll, Iowa, Commanding General, Fort Snelling, Minn.
 STEUBE, Ronald Walter, 1st Lieut., St. Paul, Commanding General, Fort Snelling, Minn.
 WITTE, Herbert Joseph, Captain, Marathon, Iowa, Commanding Officer, Fort Meade, S. D.
 SMITH, Elmer Milton, 1st Lieut., State Center, Iowa, Commanding Officer, Fort Meade, S. D.
 HENNING, Joseph Regnald, 1st Lieut., Ottawa Kan., Commanding Officer, Fort Leavenworth, Kan.
 AVERY, Hiram Henry, Capt., Omaha, Commanding General, Fort Leavenworth, Kan.
 BYERS, Walter Lewis, 1st Lieut., Sheffield, Iowa, Commanding General, Fort Snelling, Minn.
 MUNGER, Horace Varnum, 1st Lieut., Lincoln, Neb., Commanding General, Fort Des Moines, Iowa
 ADAMS, Marvin Edward, 1st Lieut., Clark, S. D., Commanding General, Fort Des Moines, Iowa
 BURNETT, Francis Kirk, Captain, Clarinda, Iowa, Commanding General, Fort Snelling, Minn.
 LIMBURG, John Irwin Jr., 1st Lieut., Jefferson, Iowa, Commanding General, Fort Snelling, Minn.
 LINNER, Gunnar, 1st Lieut., Minneapolis, Commanding General, Fort Snelling, Minn.
 GUNLAUGSON, Frederick Gunnar, 1st Lieut., Mankato, Minn., Commanding General, Fort Snelling, Minn.
 HENDRICKSON, George Charles, Captain, Lebanon, Kan., Commanding Officer, Fort Omaha, Neb.
 YAFFE, Henry Irvin, Captain, Minneapolis, Commanding General, Fort Snelling, Minn.
 ROGGEN, Ivan John, 1st Lieut., Maurice, Iowa, Commanding General, Fort Snelling, Minn.
 FRAZIER, Victor Eugene, Captain, Kansas City, Mo., Commanding Officer, Richards Field, Kansas City, Kan.
 KADLUBOWSKI, Edmund John, 1st Lieut., LeMay, Mo., Commanding Officer, Jefferson Barracks, Mo.
 PLECHAS, Nicholas Peter, 1st Lieut., Omaha, Commanding Officer, Fort Crook, Neb.
 KASHA, Robert Leonard, 1st Lieut., Jefferson Barracks, Mo., Commanding Officer, Jefferson Barracks, Mo.
 CLARK, Ira Delos, 1st Lieut., Casselton, N. D., Commanding General, Fort Snelling, Minn.
 HANSS, Armand William, Captain, Springfield, Mo., Commanding Officer, Jefferson Barracks, Mo.
 SPEIRS, Richard Everett, Captain, Dodge City, Kan., Commanding General, Fort Des Moines, Iowa
 GARLINGHOUSE, Robert Orestes, 1st Lieut., Iowa City, Commanding General, Fort Snelling, Minn.
 FOGLE, Robert Lee, Captain, Otterville, Mo., Commanding Officer, Jefferson Barracks, Mo.
 FREEDLAND, Morris, 1st Lieut., Callender, Iowa, Commanding General, Fort Des Moines, Iowa
 STEARNS, Alexander Bryce, 1st Lieut., Des Moines, Iowa, Commanding Officer, Fort Meade, S. D.
 RIGGS, George Thomas, 1st Lieut., Amity, Mo., Commanding Officer, Jefferson Barracks, Mo.
 KRIGSTEN, William Max, 1st Lieut., Sioux City, Iowa, Commanding General, Fort Snelling, Minn.
 KLAUMAN, Benjamin Franklin, 1st Lieut., Kansas City, Mo., Commanding Officer, Fort Crook, Neb.
 GRIGSBY, Kenneth Raymond, Captain, Medicine Lodge, Kan., Commanding Officer, Fort Crook, Neb.
 JAMES, Louis Daniel, 1st Lieut., Oxford, Neb., Commanding General, Fort Benning, Ga.

DARNELL, Thomas Ficklin, 1st Lieut., Macon, Mo., Commanding General, Fort Snelling, Minn.
 MATASSARIN, Frederick William, 1st Lieut., Wichita, Kan., Commanding General, Fort Benning, Ga.
 COOPER, Elven Ross, Captain, Warrensburg, Mo., Commanding Officer, Jefferson Barracks, Mo.
 HAUKENBERRY, Everett Francis, Captain, Stockdale, Kan., Commanding General, Fort Benning, Ga.
 HUGHES, Max, 1st Lieut., Walnut Ridge, Ark., Commanding General, Fort Benning, Ga.
 WOOD, Turner Anderson, 1st Lieut., Conway, Ark., Commanding General, Fort Benning, Ga.
 THOMAS, Horace Edward, 1st Lieut., Columbia, Mo., Commanding General, Fort Benning, Ga.
 ROBERTS, Howard Emerson, 1st Lieut., Topeka, Kan., Commanding Officer, Camp Joseph T. Robinson, Ark.
 VANDOVER, John Taylor, 1st Lieut., St. Louis, Commanding General, Fort Benning, Ga.
 KNOLL, William, 1st Lieut., McLaughlin, S. D., Commanding General, Fort Benning, Ga.
 RAY, Richard Horace, 1st Lieut., Willow Springs, Mo., Commanding General, Fort Benning, Ga.
 CARLSON, Marlin Winthrop, 1st Lieut., Ellinwood, Kan., Commanding General, Fort Benning, Ga.
 BUHL, Clayton Edwin, 1st Lieut., Mullen, Neb., Commanding Officer, Jefferson Barracks, Mo.
 SMITH, James Turner, 1st Lieut., Paris, Ark., Commanding General, Fort Benning, Ga.
 HUSKINS, James Daniel, 1st Lieut., Siloam Springs, Ark., Commanding General, Fort Benning, Ga.
 KELLY, Miles Fountain, 1st Lieut., Sheridan, Ark., Commanding Officer, Jefferson Barracks, Mo.
 VAUBEL, Ellis Kendall, 1st Lieut., Peterson, Iowa, Commanding General, Fort Benning, Ga.
 HELLWEG, Charles Edward, Captain, Mount Vernon, Mo., Commanding Officer, Jefferson Barracks, Mo.
 SLAUGHTER, Wilbur Logan, Captain, Clarksville, Ark., Commanding General, Fort Benning, Ga.
 BANET, Samuel Richard, 1st Lieut., St. Louis, Commanding General, Fort Benning, Ga.
 FRY, Gerald Alba, 1st Lieut., Wichita, Kan., Commanding General, Fort Benning, Ga.
 GREENBAUM, Roy, 1st Lieut., St. Louis, Commanding General, Fort Benning, Ga.
 JACKSON, Jabez Fenton, 1st Lieut., Walnut Ridge, Ark., Commanding General, Fort Benning, Ga.
 SHADE, Virgil Edward, Captain, Liberty, Mo., Commanding General, Fort Benning, Ga.
 ZINSCHLAG, Edward Nichoff, 1st Lieut., Glendale, Mo., Commanding General, Fort Benning, Ga.
 THOMPSON, Elvin Dean, 1st Lieut., Webster City, Iowa, Commanding General, Fort Benning, Ga.
 WALLACE, Edwin Sharp, Captain, Lexington, Mo., Commanding General, Fort Benning, Ga.
 McGEE, William Joseph, 1st Lieut., Eldorado, Mo., Commanding General, Fort Benning, Ga.
 DILLON, John Alfred Jr., Captain, Great Bend, Kan., Commanding General, Fort Benning, Ga.
 GRIMES, Burton Piper, 1st Lieut., St. Peter, Minn., Commanding General, Fort Benning, Ga.
 BINNS, Byron Zack, 1st Lieut., Monticello, Ark., Commanding General, Fort Benning, Ga.
 KLIPPEN, Arthur J., 1st Lieut., St. Louis, Commanding General, Fort Benning, Ga.
 WEINBERG, Harry B., 1st Lieut., Davenport, Iowa, Commanding General, Fort Benning, Ga.
 BURBRIDGE, Glen E., 1st Lieut., Logan, Iowa, Commanding General, Fort Benning, Ga.

NAVAL RESERVE OFFICERS ORDERED TO ACTIVE DUTY

Following is a list of naval reserve officers who have been called to active duty, together with a record of their grade, permanent address and station to which they have been sent. THE JOURNAL proposes to print regularly the announcements concerning reserve officers assigned to active duty both in the Army and in the Navy Medical Corps.

ANDERSON, Robert H., Lieut. M. C.-V. (S.), New York, Naval Albany, N. Y.
 ... Lieut. Comdr. M. C.-O., Jacksonville, Fla., Naval Reserve Armory, Jacksonville, Fla.
 AGNEW, John R., Lieut. M. C.-V. (S.), Springfield, Mass., Marine Recruiting Station, Springfield, Mass.
 ALBRITAIN, J. W., Lieut. (j. g.) M. C.-O., Baltimore, Norfolk Naval Hospital
 ALDRICH, Leonard C., Lieut. (j. g.) M. C.-O., Houghton, Mich., Hancock, Mich.
 ARNOLD, H. B., Lieut. Comdr. M. C.-O., New Haven, Conn., Naval Reserve Armory, New Haven, Conn.
 BAILEY, Byron G., Lieut. M. C.-V. (S.), San Diego, Calif., M. C. B., San Diego, Calif.

BAKST, Henry J., Lieut. (j. g.) M. C.-V. (S.), Brookline, Mass., Naval Hospital, Boston.
 BARNER, Henry Adolph, Lieut. Comdr. M. C.-V. (G.), Bremerton, Wash., N. Yd., Puget Sound, Wash.
 BARNSHAW, Harold D., Lieut. M. C.-O., Merchantville, N. Y., N. H., Pensacola, Fla.
 BARON, Abraham Isaac, Lieut. Comdr. M. C.-V. (S.), Jasper, Texas, N. H., Chelsea, Mass.
 BARTON, Edward William Jr., Lieut. (j. g.) M. C.-V. (S.), San Gabriel, Calif., 11th Naval District
 BASSETT, Robert B., Lieut. (j. g.) M. C.-O., St. Louis, N. R. A. B., St. Louis (Robertson)
 BELL, Fredric W., Lieut. M. C.-V. (S.), Warrington, Fla., N. H., Pensacola, Fla.
 BERTRAM, Albert J., Lieut. Comdr. M. C.-V. (S.), Miami, Fla., Naval Reserve Armory, Miami, Fla.
 BIBLER, Lester D., Lieut. M. C.-O., Indianapolis, 16th Bn., U. S. M. C. R., Indianapolis
 BIGELOW, Robert B., Lieut. Comdr. M. C.-V. (S.), Boston, N. A. S., Pensacola, Fla.
 BIRD, James D. Jr., Lieut. M. C.-V. (S.), Wheeling, W. Va., N. H., San Diego, Calif.
 BLEASBY, Charles B., Lieut. Comdr. M. C.-O., Garfield, N. J., N. T. S., N. O. B., Norfolk, Va.
 BOGGS, Robert, Lieut. M. C.-V. (G.), New York, U. S. S. Illinois

- BOSTIC, Sam Crawford, Lieut. M. C.-V. (G.), Flushing, N. Y., 3d Naval District
- BOWEN, Harold J., Lieut. Comdr. M. C.-O., Charleston, S. C., Naval Reserve Armory, Charleston, S. C.
- BOVERS, John Z., Lieut. (j. g.) M. C.-O., Baltimore, Norfolk Naval Hospital
- BOWSER, Frank E., Lieut. M. C.-V. (G.), Key West, Fla., N. Sta., Key West, Fla.
- BRADY, Alfred S. Jr., Lieut. M. C.-V. (S.), Charleston, W. Va., N. T. S., Newport, R. I.
- BREUCHER, William, Lieut. Comdr. M. C.-O., Philadelphia, 6th Bn., U. S. M. C. R., Philadelphia
- BROOKS, Morris, Lieut. Comdr. M. C.-V. (S.), Brooklyn, Navy Yard, New York
- BROWN, Byron F., Lieut. Comdr. M. C.-O., Hopedale, Mass., N. H., Newport, R. I.
- BROWN, John Joseph, Lieut. M. C.-V. (S.), Bellerose, N. Y., Rec. Ship (U. S. S. Camden), Brooklyn
- BUCKLEY, Clarence J., Lieut. Comdr. M. C.-V. (S.), Cleveland, Navy Yard, Philadelphia
- BULLWINKEL, Harry G., Lieut. Comdr. M. C.-O., Garden City, N. Y., N. H., Brooklyn
- BURRIS, Floyd L., Lieut. (j. g.) M. C.-O., Michigan City, Ind., Naval Reserve Armory, Michigan City, Ind.
- BYERS, Philip Larkin, Lieut. (j. g.) M. C.-V. (G.), Kansas City, Mo., N. R. S., Kansas City, Mo.
- CARDWELL, John L., Lieut. Comdr. M. C.-O., Washington, D. C., N. H., Washington, D. C.
- CARMODY, Robert F., Lieut. M. C.-O., Brookline, Mass., 2d Bn., U. S. M. C. R., Boston
- CARSON, James G., Lieut. (j. g.) M. C.-V. (G.), San Francisco, 12th Naval District
- CHAPMAN, Sims A., Lieut. Comdr. M. C.-O., New Orleans, N. H., Pensacola, Fla.
- CHURCHILL, Asa G., Lieut. Comdr. M. C.-O., Coronado, Calif., N. H., San Diego, Calif.
- CLARK, Irving T., Lieut. (j. g.) M. C.-V. (G.), Opa Locka, Fla., N. A. S., Miami, Fla.
- CLIFFORD, Richard V., Lieut. (j. g.) M. C.-V. (G.), Drexel Hill, Pa., N. H., Philadelphia
- COLLINS, B. Bruce, Lieut. (j. g.) M. C.-V. (G.), Rock Island, Ill., N. A. S., Pensacola, Fla.
- CONNELL, DeBert, W., Lieut. (j. g.) M. C.-O., Berkeley, Calif., N. H., Mare Island, Calif.
- COOK, Enos P., Lieut. Comdr. M. C.-O., San Jose, Calif., N. H., Mare Island, Calif.
- COOPER, Howard N., Lieut. M. C.-O., Watertown, N. Y., N. T. S., Newport, R. I.
- COUNTS, William R., Lieut. (j. g.) M. C.-V. (G.), Amonate, Va., N. R. A. B., Anacostia, D. C.
- COX, Russell M., Lieut. Comdr. M. C.-O., Portsmouth, Va., Norfolk Naval Hospital
- CRANDALL, Bradford B., Lieut. (j. g.) M. C.-M., Mansfield, Conn., Navy Yard Disp., Philadelphia
- CRUICKSHANK, Frank S., Lieut. M. C.-V. (S.), Brookline, Mass., Navy Yard Disp., Boston
- CUPAIUOLI, Richard A., Lieut. (j. g.) M. C.-V. (G.), North Bergen, N. J., 4th Bn., U. S. M. C. R., Newark, N. J.
- CUSHING, Edward H., Lieut. Comdr. M. C.-V. (S.), Bratenahl, Ohio, Bu. M. & S., Navy Dept., Washington, D. C.
- DALY, Sylvester, Lieut. M. C.-V. (S.), Westwood, N. J., N. R. A. B., Floyd Bennett Field, N. Y.
- DANIELS, Donald Howard, Lieut. M. C.-O., Portland, Me., Naval Reserve Armory, Portland, Me.
- DANNA, Pascal L., Lieut. M. C.-V. (S.), New Orleans, N. R. S., New Orleans
- DAVIES, Drew L., Lieut. M. C.-O., Columbus, Ohio, Columbus, Ohio
- DAVIS, William J. N., Lieut. Comdr. M. C.-V. (G.), Chicago, N. R. Signal School, Chicago
- DE CICCIO, Luigi M., Lieut. Comdr. M. C.-V. (S.), Fitchburg, Mass., Navy Yard, Portsmouth, N. H.
- DE COSTA, Edwin J., Lieut. M. C.-O., Chicago, 9th Bn., U. S. M. C. R., Chicago
- DEMENT, Donald E., Lieut. Comdr. M. C.-V. (G.), Squantum, Mass., N. R. A. B., Boston
- de YOANNA, Saverio A., Lieut. Comdr. M. C.-V. (S.), Brooklyn, Navy Yard Disp., New York
- DICKINSON, Everett H., Lieut. Comdr. M. C.-V. (G.), Ardmore, Pa., N. H., Philadelphia
- DOBBS, Frederick H., Lieut. (j. g.) M. C.-V. (G.), Wheeling, W. Va., N. A. S., Pensacola, Fla.
- DOBBS, Otto Ross, Lieut. Comdr. M. C.-V. (S.), St. Louis, N. R. S., St. Louis
- DOBSON, John P., Lieut. (j. g.) M. C.-V. (G.), Manhasset, N. Y., N. A. S., Pensacola, Fla.
- DOCKRY, Lyman Edwin, Comdr. M. C.-V. (G.), Great Lakes, Ill., N. T. S., Great Lakes, Ill.
- DOYLE, Joseph Bernard, Lieut. (j. g.) M. C.-V. (S.), Newton, Mass., N. H., Chelsea, Mass.
- DRAVO, Emory Low, Lieut. Comdr. M. C.-V. (S.), Great Lakes, Ill., N. T. S., Great Lakes, Ill.
- ELLETT, William H., Lieut. M. C.-O., Appleton City, Wis., N. H., San Diego, Calif.
- ENGLISH, Glenn G., Lieut. M. C.-O., Los Angeles, 13th Bn., U. S. M. C. R., Los Angeles
- FAKEHANY, Joseph P., Lieut. (j. g.) M. C.-V. (G.), Toledo, Ohio, Toledo, Ohio
- FERGUSON, R. S., Lieut. Comdr. M. C.-V. (S.), New York, Norfolk Naval Hospital
- FLYNN, John R., Lieut. (j. g.) M. C.-V. (G.), Tacoma, Wash., 13th Naval District, Seattle
- FORBES, Alexander, Lieut. Comdr. M. C.-V. (S.), Milton, Mass., N. A. S., Pensacola, Fla.
- FORD, Richard B., Lieut. M. C.-V. (S.), Tulsa, Okla., N. H., Pensacola, Fla.
- FOX, Frederick G., Lieut. Comdr. M. C.-V. (S.), Chicago, M. R., Quantico, Va.
- FOX, M. R., Lieut. Comdr. M. C.-V. (S.), Portsmouth, Va., Norfolk Naval Hospital
- FREYMANN, John J., Lieut. Comdr. M. C.-V. (G.), Omaha, N. R. S., Omaha
- FRONEK, Otis John, Lieut. (j. g.) M. C.-V. (G.), University Heights, Ohio, N. R. S., Cleveland
- FUQUA, Samuel A., Lieut. Comdr. M. C.-V. (G.), Chicago, N. T. S., Great Lakes, Ill.
- GARNETT, Herman M., Lieut. M. C.-V. (G.), Long Island City, N. Y., Rec. Ship, New York
- GATES, Donald C., Lieut. M. C.-V. (S.), Boston, N. A. S., Pensacola, Fla.
- GAYNOR, Edmund P., Lieut. (j. g.) M. C.-O., San Francisco, N. H., Mare Island, Calif.
- GERNARD, Henry C., Lieut. M. C.-O., Los Angeles, Naval Dispensary, Long Beach, Calif.
- GERSTLE, Mark L. Jr., Lieut. M. C.-V. (S.), Cupertino, Calif., 11th Naval District, San Diego, Calif.
- GILBERT, Allen C., Lieut. Comdr. M. C.-V. (S.), Dallas, Texas, Norfolk Navy Yard
- GINDHART, Floyd D., Lieut. M. C.-O., New York, N. H., Brooklyn
- GOLDBLATT, Harold W., Lieut. (j. g.) M. C.-V. (G.), Lawrence, Mass., Navy Yard Disp., Boston
- GOLDSMITH, Harry, Lieut. Comdr. M. C.-V. (S.), Baltimore, M. B., Quantico, Va.
- GOLLER, John J., Lieut. Comdr. M. C.-O., Staten Island, N. Y., N. H., Newport, R. I.
- GRAYBIEL, Ashton, Lieut. Comdr. M. C.-V. (S.), Brookline, Mass., N. A. S., Pensacola, Fla.
- GROW, W. L., Lieut. Comdr. M. C.-V. (S.), Bonita, Calif., U. S. S. Rigel
- GRUGGEL, John S., Lieut. M. C.-M., New York, Sub. Base, New London, Conn.
- HAGUE, Robert F., Lieut. M. C.-V. (G.), Flint, Mich., N. T. S., Great Lakes, Ill.
- HALL, Frank McK., Lieut. M. C.-V. (G.), West Lafayette, Ind., U. S. S. Sacramento
- HALPERIN, Meyer A., Lieut. Comdr. M. C.-V. (S.), Brooklyn, N. H., Brooklyn
- HAMER, Jerome B., Lieut. (j. g.) M. C.-V. (G.), Charlotte, N. C., Marine Corps Res., Charlotte, N. C., 21st Bn.
- HAMMERSELEY, Eugene R., Lieut. M. C.-V. (G.), Tuscarawas, Ohio, F. M. F., M. B., Quantico, Va.
- HAMMOND, Jack, Lieut. (j. g.) M. C.-O., New York, N. H., Chelsea, Mass.
- HAMMOND, T. V. Jr., Lieut. Comdr. M. C.-V. (G.), Meadows, Md., Navy Yard, Portsmouth, N. H.
- HANTEN, John Sylvester, Lieut. M. C.-V. (S.), San Francisco, N. H., Mare Island, Calif.
- HARBACH, Francis O., Lieut. M. C.-V. (S.), Fayetteville, N. Y., M. R. S., Syracuse, N. Y.
- HARKINS, Herbert P., Lieut. (j. g.) M. C.-V. (G.), Melrose Park, Pa., N. H., Philadelphia
- HARRIS, Sydney L., Lieut. M. C.-O., Pelham Manor, N. Y., Nav. Res. Radio School, Noroton, Conn.
- HAUMAN, Hazen L., Lieut. (j. g.) M. C.-O., Toledo, Ohio, 8th Bn., U. S. M. C. R., Toledo, Ohio
- HAWES, John K., Lieut. M. C.-V. (G.), Brooklyn, N. R. A. B., New York (Brooklyn)
- HELGESEN, Uno, H., Lieut. Comdr. M. C.-V. (S.), Northampton, Mass., N. H., Washington, D. C.
- HERNDON, Ray F., Lieut. Comdr. M. C.-O. Retired, Houston, Texas, N. R. S., Dallas, Texas
- HITCH, Joseph Martin, Lieut. (j. g.) M. C.-V. (S.), Raleigh, N. C., N. R. S., Raleigh, N. C.
- HOCKETT, Verden Edw., Lieut. M. C.-V. (G.), Salem, Ore., State Med. Off. with Director of Selective Serv. State of Oregon
- HODGES, Francis T., Lieut. (j. g.) M. C.-V. (G.), San Francisco, 12th Naval District
- HOFER, Clarence J. M., Lieut. M. C.-O., Matuchen, N. J., N. T. S., Newport, R. I.
- HOGEBOOM, Willard L., Lieut. (j. g.) M. C.-O., Helmuth, N. Y., Norfolk Naval Hospital
- HOLM, Alf J., Lieut. Comdr. M. C.-V. (S.), Chicago, N. T. S., Great Lakes, Ill.
- HOMAN, Ralph H., Lieut. Comdr. M. C.-V. (S.), El Paso, Texas, N. H., Parris Island, S. C.
- HUMMEL, Merwin L., Lieut. M. C.-O., Merchantville, N. J., N. R. A. B., Cape May, N. J.
- HUNGATE, Carroll P., Lieut. M. C.-V. (G.), Kansas City, Mo., 8th Bn., U. S. M. C. R.
- ICKS, Karl, Lieut. M. C.-O., Green Bay, Wis., Green Bay, Wis.
- IVES, Warren C., Lieut. Comdr. M. C.-V. (G.), Rockford, Ill., Sub. Base, New London, Conn.
- JABLONS, Abraham, Lieut. Comdr. M. C.-V. (G.), New York, N. A. S., Norfolk, Va.
- JACKSON, Harry H., Lieut. Comdr. M. C.-V. (G.), Detroit, N. R. A. B., Grosse Isle, Mich.
- JACKSON, Waddie P., Comdr. M. C.-V. (G.), Roanoke, Va., N. A. S., Norfolk, Va.
- JACOBSON, Sheldon A., Lieut. M. C.-V. (G.), Brooklyn, N. H., Philadelphia

- JAMES, Gordon M., Lieut. M. C.-V. (G.), Bremerton, Wash., Navy Yard Disp., Bremerton, Wash.
- JEWETT, Everett Porter, Lieut. Comdr. M. C.-O., Worcester, Mass., Naval Reserve Armory, Worcester, Mass.
- JOHNSRUD, Russell L., Lieut. (j. g.) M. C.-O., Portland, Ore., N. R. S., Portland, Ore.
- JOSEPHS, Louis, Lieut. Comdr. M. C.-V. (S.), Los Angeles, M. C. B., San Diego, Calif.
- JUNKIN, William McC., Lieut. Comdr. M. C.-V. (S.), Fredericksburg, Va., N. T. S., Norfolk, Va.
- KAHN, Gustav M., Lieut. (j. g.) M. C.-O., Galveston, Texas, 15th Bn., U. S. M. C. R., Galveston, Texas
- KECK, Everett B., Lieut. Comdr. M. C.-V. (S.), Madison, Wis., M. B., Quantico, Va.
- KECK, Herman, Lieut. M. C.-O., Cincinnati, N. H., San Diego, Calif.
- KENNEY, LeRoy, L., Lieut. Comdr. M. C.-V. (S.), Kerrville, Texas, N. H., Pensacola, Fla.
- KLEIN, Leonard, Lieut. (j. g.) M. C.-V. (G.), New York, N. R. S., New York
- KNOWLTON, Don S., Lieut. Comdr. M. C.-V. (S.), Washington, D. C., 5th Bn., U. S. M. C. R., Washington, D. C.
- KORNBLUT, Alfred, Lieut. M. C.-O., Bridgeport, Conn., N. H., Pensacola, Fla.
- KREPELA, Miles C., Lieut. (j. g.) M. C.-V. (S.), New York, U. S. S. Illinois
- LARSON, Lawrence M., Lieut. M. C.-O., Minneapolis, N. R. A. B., Minneapolis
- LAUTERBACH, Chester H., Lieut. (j. g.) M. C.-O., Rochester, N. Y., N. H., Chelsea, Mass.
- LEBENSCHN, James E., Lieut. Comdr. M. C.-V. (G.), Chicago, N. R. S., Chicago
- LEETE, Edward D., Lieut. Comdr. M. C.-V. (G.), Boston, N. R. S., Boston
- LELAND, John A. C., Lieut. (j. g.) M. C.-V. (G.), Minneapolis, N. H., Mare Island, Calif.
- LELAND, Sherman, Lieut. M. C.-O., San Francisco, N. H., Mare Island, Calif.
- LEWIS, Will E., Lieut. (j. g.) M. C.-O., Tacoma, Wash., Naval Reserve Recruiting Office, Tacoma, Wash.
- LIEBER, Hyman, Lieut. M. C.-V. (S.), Flushing, N. Y., Navy Yard, New York
- LILJENCANTZ, Eric, Comdr. M. C.-V. (S.), San Francisco, Bu. Aero., Navy Dept., Washington, D. C.
- LIPPSCHUTZ, Eugene J., Lieut. (j. g.) M. C.-O., Williamsville, N. Y., Norfolk Naval Hospital
- LONGENECKER, Charles R., Lieut. (j. g.) M. C.-O., New York, N. T. S., Newport, R. I.
- LORENZ, George Jr., Lieut. Comdr. M. C.-V. (S.), Glenside, Pa., N. H., Philadelphia
- LUFKIN, N. H., Lieut. M. C.-V. (S.), Minneapolis, 18th Bn., St. Paul
- MACGOWAN, Birkhead, Lieut. Comdr. M. C.-V. (S.), Baltimore, Naval Reserve Armory, Baltimore, and 1st Bn., Naval Reserve
- MACNISH, James M., Lieut. (j. g.) M. C.-O., Webster Groves, Mo., N. H., San Diego, Calif.
- MARSDEN, George A., Lieut. Comdr. M. C.-O., Oswego, N. Y., N. T. S., Newport, R. I.
- MARTIN, William L., Comdr. M. C.-O., Merion Station, Pa., N. H., Philadelphia
- MASON, Malcolm W., Lieut. M. C.-V. (S.), Elmhurst, N. Y., Third Naval District
- MAYNE, Roy Malone, Lieut. Comdr. M. C.-O., Duluth, Minn., U. S. S. Paducah
- MCCARTHY, Donald, Lieut. Comdr. M. C.-V. (G.), Minneapolis, N. R. S., Minneapolis
- MCCRIMMON, Herman P., Lieut. Comdr. M. C.-V. (S.), Great Lakes, Ill., N. T. S., Great Lakes, Ill.
- MCCULLOUGH, Clifford P., Lieut. Comdr. M. C.-V. (S.), Lake Forest, Ill., N. T. S., Great Lakes, Ill.
- McKEEVER, Duncan C., Lieut. M. C.-O., Houston, Texas, Naval Reserve Armory, Houston, Texas
- McKITTERICK, John C., Lieut. Comdr. M. C.-O., Burlington, Iowa, Burlington, Iowa
- McLEAN, Marvin McD., Lieut. Comdr. M. C.-V. (S.), Washington, D. C., Navy Yard, Washington, D. C.
- McMAHON, Henry E., Lieut. M. C.-V. (G.), Plandome, N. Y., N. H., Brooklyn
- McNAMARA, D. H., Lieut. (j. g.) M. C.-O., Santa Barbara, Calif., Naval Disp., Long Beach, Calif.
- MEADOR, James R., Lieut. (j. g.) M. C.-O., Clayton, Mo., N. H., San Diego, Calif.
- MECK, Floyd S., Lieut. M. C.-V. (G.), Cleveland Heights, Ohio, N. R. S., Cleveland
- MERRITT, Edward L., Lieut. Comdr. M. C.-V. (S.), Fall River, Mass., N. H., Newport, R. I.
- MEYERS, Frederick C., Lieut. M. C.-O., Briarcliff Manor, N. Y., Norfolk Naval Hospital
- MILLER, Hugh A., Jr., Lieut. (j. g.) M. C.-O., Detroit, U. S. S. Dubuque
- MILLER, LaFayette T., Lieut. Comdr. M. C.-O., Dallas, Texas, Naval Reserve Armory, Dallas, Texas
- MINTZ, Emanuel R., Lieut. M. C.-V. (S.), Boston, N. H., Chelsea, Mass.
- MITCHELL, John T., Lieut. (j. g.) M. C.-O., Miami, Fla., N. H., Pensacola, Fla.
- MITCHELL, Marvin A., Lieut. (j. g.) M. C.-O., Atlanta, Ga., Naval Reserve Armory, Atlanta, Ga.
- MITCHELL, William G., Lieut. Comdr. M. C.-V. (S.), San Angelo, Texas, N. H., Parris Island, S. C.
- MOLESKI, Stanley L., Lieut. (j. g.) M. C.-V. (G.), Grand Rapids, Mich., N. H., Great Lakes, Ill.
- MOORE, Moore, Jr., Lieut. Comdr. M. C.-V. (G.), Beckley, W. Va., N. H., Charleston, S. C.
- MOSELEY, Lonnie B., Lieut. M. C.-V. (S.), Jackson, Miss., N. H., Parris Island, S. C.
- MULLEN, Edward A., Lieut. Comdr. M. C.-O., Philadelphia, N. H., Pensacola, Fla.
- MURRAY, Ray W., Lieut. Comdr. M. C.-V. (S.), Washington, D. C., N. H., Washington, D. C.
- NELSON, Edwin R., Lieut. (j. g.) M. C.-V. (G.), Madison, Wis., N. H., Bremerton, Wash.
- NICHOLS, Samuel I., Lieut. (j. g.) M. C.-V. (S.), Norfolk, Va., (Instr. N. A. S., Pensacola)
- NORCROSS, Nathan C., Lieut. M. C.-V. (S.), Cambridge, Mass., N. H., Philadelphia
- NORTHINGTON, Page O., Comdr. M. C.-O., Garden City, N. Y., N. H., Brooklyn
- NORTHUP, Spencer W., Lieut. (j. g.) M. C.-O., Toledo, Ohio, N. T. S., San Diego, Calif.
- NUCKOLLS, John B., Lieut. M. C.-V. (S.), Charleston, S. C., N. H., Charleston, S. C.
- ORMSBY, Edward B., Lieut. Comdr. M. C.-V. (S.), Boston, N. H., Chelsea, Mass.
- O'TOOLE, John B., Jr., Lieut. (j. g.) M. C.-V. (G.), New Bedford, Mass., N. T. S., Newport, R. I.
- PAGAN, Albert E., Lieut. Comdr. M. C.-V. (S.), Washington, D. C., Navy Yard, Washington, D. C.
- PARKER, Arthur D., Lieut. Comdr. M. C.-V. (S.), Norfolk, Va., N. T. S., N. O. B., Norfolk, Va.
- PARKER, Thomas, Lt. (j. g.) M. C.-V. (S.), Greenville, S. C., Navy Yard, Charleston, S. C.
- PARSONS, William C., Lieut. M. C.-O., Birmingham, Ala., Naval Reserve Armory, Birmingham, Ala.
- PEEK, John S., Lieut. (j. g.) M. C.-V. (G.), Brownsville, Texas, N. A. S., Pensacola, Fla.
- PENTZ, Clarence R., Lieut. M. C.-O., Long Beach, Calif., N. R. A. B., Long Beach, Calif.
- PEPPER, Milton, Lieut. (j. g.) M. C.-V. (S.), Salt Lake City, N. R. S., Salt Lake City
- PETERS, John R., Lieut. Comdr. M. C.-V. (S.), Pewee Valley, Ky., N. T. S., Great Lakes, Ill.
- PETRIK, Albert C., Lieut. Comdr. M. C.-V. (S.), Tuscaloosa, Ala., Naval Stat., Key West, Fla.
- PETRONE, Francis J., Lieut. M. C.-V. (G.), Fall River, Mass., N. A. S., Quoinet Point, R. I.
- PHILBROOK, Frank R., Lieut. M. C.-V. (S.), Somerville, Mass., N. R. A. B., Squantum, Boston
- PIEPER, Howard C., Lieut. (j. g.) M. C.-V. (G.), Long Branch, N. J., N. R. A. B., Chicago (Glenview), Ill.
- POTTER, Leo E., Lieut. M. C.-V. (S.), Houston, Texas, N. R. S., Houston, Texas
- PRICE, Richard H., Lieut. Comdr. M. C.-V. (S.), Quantico, Va., N. H., Parris Island, S. C.
- PUTTLER, Simpson D., Lieut. (j. g.) M. C.-V. (G.), Grosse Ile, Mich., N. R. A. B., Grosse Ile, Detroit
- RAVEL, Vincent M., Lieut. (j. g.) M. C.-V. (G.), El Paso, Texas, N. R. S., Dallas, Texas
- REDDING, John O., Lieut. M. C.-O., New Orleans, 10th Bn., U. S. M. C. R., New Orleans
- REGAN, James J., Lieut. Comdr. M. C.-V. (G.), Boston, N. H., Chelsea, Mass.
- RICHARD, Harold J., Lieut. Comdr. M. C.-V. (S.), Pensacola, Fla., N. A. S., Pensacola, Fla.
- ROBERTSON, Charles G., Lieut. Comdr. M. C.-V. (G.), San Diego, Calif., M. C. B., San Diego, Calif.
- ROBERTS, Melvin D., Lieut. Comdr. M. C. Retired, Hancock, Mich., M. R. S., Salt Lake City
- ROBERTSON, Robert F., Lieut. (j. g.) M. C.-V. (G.), Los Angeles, N. H., San Diego, Calif.
- ROBINSON, Nathaniel D., Lieut. (j. g.) M. C.-V. (G.), Pawtucket, R. I., N. R. A. B., Kansas City, Kan.
- ROONEY, James S., Lieut. Comdr. M. C.-V. (S.), Newton, Mass., N. H., Chelsea, Mass.
- ROSEN, Abner, Lieut. (j. g.) M. C.-V. (G.), New York, Nav. Torp. Sta., Newport, R. I.
- ROSEN, Max, Lieut. M. C.-V. (S.), Brooklyn Navy Yard, New York
- ROSENBLOOM, Monroe A., Lieut. M. C.-V. (S.), New York, Third Naval District
- ROSSER, Marion T., Lieut. Comdr. M. C.-V. (S.), Parris Island, S. C., Norfolk Naval Hospital
- ROWOHLT, George O., Lieut. (j. g.) M. C.-O., Dumont, N. J., Norfolk Naval Hospital
- SALA, Roland O., Lieut. Comdr. M. C.-V. (G.), Rock Island, Ill., N. A. S., Pensacola, Fla.
- SALING, Robert P., Lieut. (j. g.) M. C.-V. (G.), Pittsburgh, N. H., Philadelphia
- SASKA, August, Lieut. Comdr. M. C.-O., Pittsburgh, M. R. S., Pittsburgh
- SASSMAN, John J., Lieut. (j. g.) M. C.-V. (G.), Allentown, Pa., N. A. S., San Diego, Calif.
- SAVERIEN, Arnold E., Lieut. Comdr. M. C.-O., Los Angeles, Naval Disp., Long Beach, Calif.
- SAXL, Newton T., Lieut. Comdr. M. C.-V. (S.), New York, N. H., Brooklyn
- SCHACHTER, H. A. II., Lieut. Comdr. M. C.-V. (S.), Newark, N. J., N. H., Brooklyn
- SHAFER, William L. Jr., Lieut. Comdr. M. C.-O., Alexandria, Va., 5th Bn., U. S. M. C. R., Washington, D. C.
- SCOTT, Edgar M., Jr., Lieut. M. C.-V. (S.), Birmingham, Ala., N. R. S., Birmingham, Ala.
- SEGAL, Samuel, Jr., Lieut. Comdr. M. C.-O., Springfield, Mass., Naval Reserve Armory, Springfield, Mass.
- SHELDON, Suel A., Lieut. Comdr. M. C.-O., Saginaw, Mich., Saginaw, Mich.
- SHER, Joseph J., Lieut. M. C.-V. (S.), Brooklyn, N. H., Brooklyn
- SHONE, Lloyd B., Lieut. Comdr. M. C.-V. (G.), San Francisco, Headquarters, 12th Naval District

SHAW, James R. S., Jr., Lieut. (j. g.) M. C.-O., Georgetown, S. C., Naval Reserve Armory, Georgetown, S. C.
SIMPSON, William A., Lieut. Comdr. M. C.-V. (S.), Baltimore, Navy Yard, Norfolk, Va.
SISSON, Merrell A., Lieut. (j. g.) M. C.-O., Portland, Ore., 20th Bn., U. S. M. C. R., Portland, Ore.
SMART, William R., Lieut. (j. g.) M. C.-V. (G.), Oklahoma City, N. H., Parris Island, S. C.
SMITH, Arthur B. R., Lieut. M. C.-V. (S.) Jersey City, N. J., Sub. Base, New London, Conn.
SOORS, James W., Lieut. (j. g.) M. C.-O., Peoria, Ill., N. T. S., San Diego, Calif.
SOUTHCORBE, Robert H., Lieut. M. C.-O., Spokane, Wash., 14th Bn., U. S. M. C. R., Spokane, Wash.
SOUTHWORTH, V. C., Lieut. Comdr. M. C.-V. (S), Cambridge, Md., N. H., Pensacola, Fla.
SPEER, Frederic A., Lieut. (j. g.) M. C.-O., Kansas City, Kan., N. H., San Diego, Calif.
SPEER, Leland N., Lieut. (j. g.) M. C.-O., Kansas City, Mo., N. H., San Diego, Calif.
STEDMAN, Harold E., Lieut. M. C.-V. (G.), Hempstead, N. Y., N. H., Brooklyn
STEIN, Emil J., Comdr., M. C.-A., Chicago, N. T. S., Great Lakes, Ill.
STEINBERG, Miguel, Lieut. Comdr. M. C.-V. (S.), New York, N. H., Brooklyn
STEWART, Wayne H., Lieut. (j. g.) M. C.-O., Coraopolis, Pa., N. T. S., N. O. B., Norfolk, Va.
STOOPS, William A., Comdr. M. C.-V. (G.), Newport, R. I., N. H., Newport, R. I.
STUTTLE, Fred L., Lieut. (j. g.) M. C.-V. (G.), Peoria, Ill., Peoria, Ill.
THOMAS, George C., Lieut. Comdr. M. C.-V. (G.), Mifflinburg, Pa., Navy Yard, Philadelphia
THOMAS, Wesley C., Lieut. Comdr. M. C.-V. (S.), Charleston, W. Va., N. H., Parris Island, S. C.
THURSTON, H. S., Lieut. Comdr. M. C.-O. Retired, Indianapolis, Naval Reserve Radio School, Indianapolis
TIPTON, Van C., Lieut. M. C.-V. (S.), Austin, Texas, N. R. S., Macon, Ga.
TORLAND, Paal, Lieut. Comdr. M. C.-V. (S.), San Diego, Calif., N. T. S., San Diego, Calif.
TROENSEGAARD, Clement C., Lieut. Comdr. M. C.-V. (S.), Pasadena, Calif., N. R. A. B., Oakland, Calif.
UNDERWOOD, George R., Lieut. (j. g.) M. C.-V. (S.), Lincoln, Neb., Naval Reserve Armory, Omaha
VIEIRA, Edwin, Lieut. (j. g.) M. C.-V. (G.) East Providence, R. I., Nav. Torp. Sta., Newport, R. I.
WALD, Oscar, Lieut. Comdr. M. C.-V. (S.), Brooklyn, N. R. S., New York
WARD, Robert H., Lieut. (j. g.) M. C.-V. (G.), Boston, N. A. S., Pensacola, Fla.

WARM, Herbert, Lieut. (j. g.) M. C.-V. (G.), Hamilton, Ohio, N. R. S., Cincinnati
WARREN, Jack, Lieut. (j. g.) M. C.-V. (G.), Tabatchi, N. M., Yd., Disp., Puget Sound, NYd., Bremerton, Wash.
WARREN, Richard, Lieut. (j. g.) M. C.-O., Boston, N. H., Chelsea, Mass.
WASSELL, Corydon M., Lieut. Comdr. M. C.-V. (S.), Key West, Fla., Naval Station, Key West, Fla.
WATKINS, Harry C., Jr., Lieut. M. C.-O., Aberdeen, Wash., Naval Reserve Armory, Aberdeen, Wash.
WEAVER, Harry S., Jr., Lieut. M. C.-O., Philadelphia, N. H., Philadelphia
WEBB, Charles E., Lieut. M. C.-V. (S.), El Paso, Texas, N. H., Parris Island, S. C.
WEBB, James S., Jr., Lieut. M. C.-V. (G.), New Orleans, N. R. Armory, New Orleans
WELSH, Clyde L., Lieut. M. C.-O., Seattle, 11th Bn., U. S. M. C. R., Seattle
WERTHMAN, Paul A., Lieut. (j. g.) M. C.-V. (G.), Gustine, Calif., N. H., San Diego, Calif.
WESTON, K. R., Lieut. M. C.-V. (S.), Allentown, Pa., N. H. Philadelphia
WHALEN John M., Lieut. Comdr. M. C.-O., Grand Rapids, Mich., N. H., San Diego, Calif.
WHEELER, Howard L., Lieut. Comdr. M. C.-V. (S.), Baltimore, N. R. S., Baltimore
WHITEHEAD, Hugh G., Jr., Lieut. (j. g.) M. C.-O., Baltimore, Norfolk Naval Hospital
WIESINGER, Warren E., Lieut. (j. g.) M. C.-V. (G.) Oakland, Calif., N. H., San Diego, Calif.
WILDEBUSH, Frank F., Lieut. M. C.-V. (S.), Minneapolis, Naval Mobile Hospital No. 1
WILDMAN, Henry V., Lieut. Comdr. M. C.-O., New York, N. H., Pensacola, Fla.
WILLIAMS, George Z., Lieut. (j. g.) M. C.-O., Richmond, Va., Norfolk Naval Hospital
WILLIAMS, Harry D., Jr., Lieut. (j. g.) M. C.-V. (G.), San Francisco, N. R. A. B., Oakland, Calif.
WILLIS, Park Weed, Jr., Lieut. Comdr. M. C.-V. (S.), Seattle, 1st Bn., U. S. M. C. R., Seattle
WILSON, Leonard L., Lieut. Comdr. M. C.-V. (S.), Cheyenne, Wyo., N. H., Pensacola, Fla.
WIRIG, Marres H., Lieut. M. C.-O., Madison, Wis., Madison, Wis.
WITKIN, Leonard E., Lieut. (j. g.) M. C.-V. (G.), Brooklyn, N. R. A. B., Navy Yard, Philadelphia
YOUNG, Vincent T., Lieut. (j. g.) M. C.-O., Methuen, Mass., N. H., Chelsea, Mass.
ZOBEL, Jerome F., Lieut. (j. g.) M. C.-V. (G.), San Francisco, N. H., San Diego, Calif.

NEW MEDICAL OFFICERS

As the result of competitive examinations held in July, the following Reserve Officers have been appointed as first lieutenants in the Medical Corps of the Regular Army. Following the names are the home town and the medical school:

BARKER, Warren J., Checotah, Okla., Tulane.
BEDDOW, Leon D., Dallas, Texas, Baylor.
BERLER, Thomas T., Jr., Norman, Okla., University of Oklahoma.
BERRY, C. Z., Cincinnati, University of Cincinnati.
BORNSTEIN, Joseph H., Chelsea, Mass., Boston University.
BOZALIS, George S., St. Louis, University of Oklahoma.
BUTKUS, Walter A., Chicago Heights, Ill., Loyola.
CLEVELAND, William H., Rochester, Minn., Northwestern.
DICE, Wibur D., State University of Iowa.
DUBUY, Carl T., Tulsa, Texas, University of Michigan.
FERRELL, Lee F., Memphis, Tenn., University of Tennessee.
FRESE, Frederick J., Jr., Barksdale Field, La., St. Louis University.
FURST, John N., Hallock, Minn., University of Minnesota.

GUNN, Edward M., Providence, R. I., Syracuse University.
HARNEY, John P., New York, Long Island University.
HARWOOD, Samuel C., Los Angeles, University of Southern California.
HUMPHREYS, James W., Jr., Cincinnati, Medical College of Virginia.
HURTEAU, William W., Washington, D. C., State University of Iowa.
JACKSON, William M., Dickson, Tenn., University of Tennessee.
LAWN, R. A., Minneapolis, University of Minnesota.
LONG, Irl R., Washington University.
LOOK, William B., Fort Wayne, Mich., Washington University.
MOODY, William M., Cincinnati, University of Cincinnati.
O'BRIAN, Spencer A., Chicago, University of Georgia.
PEARSON, Murble H., Dillon, Mont., University of Oklahoma.
PETTIT, Vernon D., Memphis, Tenn., University of Tennessee.
SCHMITZ, W. G., Monterey, Calif., Loyola University
SHUEY, H. E., Cottage Grove, Ore., University of Oregon.
SPAN, Franklin L., San Antonio, Texas, Baylor University.
SWIFT, Edward V., Austin, Texas, University of Texas.
TALBOTT, Charles H., St. Louis, Washington University.
TILL, Jacob R., Jr., Klawock, Alaska, Tulane University.
TOUSIGNANT, Harvey, G., Oconto, Wis., Marquette University.
WARD, David P., Pemberville, Ohio, Ohio State University.

CONTROL OF VENEREAL DISEASE

An agreement by the War and Navy departments, the Federal Security Agency and state health departments on measures for the control of venereal disease in areas in which armed forces or national defense employees are concentrated was recently made public by the U. S. Public Health Service. The agreement outlined services to be developed by state and local health and police authorities in cooperation with medical corps of the U. S. Army, the bureau of medicine and surgery of the U. S. Navy, the public health service and interested voluntary organizations. Early diagnosis and treatment were stressed, the military personnel to be under the supervision of the Army and Navy and civilian population under local health departments. It was agreed that, when authentic information could be obtained as

to the probable source of infection of military or naval personnel, the facts would be reported by medical officers of the Army or Navy to state or local health authorities. Recalcitrant infected persons will be forcibly isolated during the period of communicability. Health authorities, both military and civilian, also agree to cooperate with police departments in decreasing as far as possible the opportunities for contacts with infected persons. Among other measures, an aggressive program of education regarding the dangers of venereal diseases was proposed. Finally the health and police authorities requested the assistance of social hygiene societies and other welfare organizations in developing and stimulating public support for the measures to be undertaken.

ORGANIZATION SECTION

OFFICIAL NOTES

SCIENTIFIC EXHIBIT

Application blanks are now available for space in the Scientific Exhibit at the Cleveland Session of the American Medical Association, June 2 to 6, 1941. They may be obtained by communicating with the Director, Scientific Exhibit, American Medical Association, 535 North Dearborn Street, Chicago.

APPLICATIONS TO THE COMMITTEE ON SCIENTIFIC RESEARCH FOR GRANTS

The Committee on Scientific Research of the American Medical Association invites applications for grants of money to aid in research on problems bearing more or less directly on clinical medicine. Preference is given to requests for moderate amounts to meet specific needs. Application forms may be obtained from the Committee, 535 North Dearborn Street, Chicago.

RADIO BROADCASTS

Doctors at Work is the title of the sixth annual series of dramatized radio programs being presented by the American Medical Association and the National Broadcasting Company.

The series opened Wednesday, November 13, and will run for thirty consecutive weeks, closing with a broadcast from the A. M. A. meeting at Cleveland on June 3, 1941. The program is scheduled for 10:30 p. m. eastern standard time (9:30 central, 8:30 mountain, 7:30 Pacific time) over the Blue network, other N. B. C. stations and Canadian stations.

These programs are broadcast on what is known in radio as a sustaining basis; that is, the time is furnished gratis by the radio network and local stations and no revenue is derived from the programs. Therefore, local stations may or may not take the programs, at their discretion, except those stations which are owned and operated by the National Broadcasting Company.

The programs will dramatize what modern medicine offers the individual in the way of opportunities for better health and the more successful treatment of disease. Incidental to this main theme the programs will explain the characteristics of the different fields of modern medicine and its specialties.

Descriptive posters for local distribution may be had gratis from the Bureau of Health Education, American Medical Association, 535 North Dearborn Street, Chicago. Program titles will be announced weekly in *THE JOURNAL* and monthly in *Hygieia*, The Health Magazine.

The next three programs to be broadcast, together with their dates and their topics, are as follows:

November 20, "The Years in Training."
November 27, "Through Hospital Corridors."
December 4, "Paging Doctor Drew."

NATIONAL BOARD MEETING IN CHICAGO

The board of directors of the Woman's Auxiliary to the American Medical Association will hold its regular meeting at the Palmer House, Chicago, beginning at 9 a. m., November 29.

WOMAN'S AUXILIARY

Colorado

The woman's auxiliary to the Montrose County Medical Society was organized in April and has had several interesting meetings with its nine members. In August the meeting was held in Olathe at the home of Mrs. R. R. Rigg, with Mrs. Richard Waldapfel, of Grand Junction, as guest speaker. She is an Austrian refugee in the United States with her husband, who is an otolaryngologist. Mrs. Waldapfel spoke on "Vienna Before and After Hitler." In August the auxiliary met at the home of Mrs. Lockwood for a mountain trout dinner, part of a limit catch made by the hostess, who is an expert angler. The September meeting was held at the home of Mrs. Norman A. Brethouwer, where arrangements were made to hold a venison dinner for the doctors, who were guests of the auxiliary at the October meeting. The primary function of the auxiliary is to sew for local hospitals.

The annual meeting of the woman's auxiliary to the Colorado State Medical Society was held at Glenwood Springs, September 12-14. Mrs. Lorenz Frank, of Denver, president of the auxiliary, presided. At the annual luncheon held Friday, September 13, with 101 members present, Mrs. V. Eugene Holcombe, of Charleston, W. Va., national president of the woman's auxiliary, gave the principal address.

New York

The woman's auxiliary to the Cayuga County Medical Society met, September 19, at the home of Mrs. George B. Adams. There were fifteen members present and ten women from Seneca County interested in forming an auxiliary.

Members of this county were busy during the summer cooperating in a sale held by the blind and working in the health booth during the county fair. A luncheon opened the first fall meeting of the auxiliary to the Broome County Medical Society at the Binghamton Club, October 10. Mrs. John H. Robertson, presiding, named committee heads for the ensuing year.

Mrs. L. H. Kice, state auxiliary president, was a guest at a well attended meeting of the county auxiliary in Saratoga Springs, October 2. "The standard of our auxiliary is 'service to humanity' and to march in its progress," was the keynote of her address.

Pennsylvania

The Franklin County auxiliary met in June at Chambersburg. At the roll call, members answered by giving a few facts on some pioneer in medicine. Mrs. John H. Doane, state auxiliary president, was guest speaker.

The annual charity party of the Lehigh County auxiliary was held in May with about 150 members and guests present. The proceeds are to be used toward the Medical Benevolence Fund. In June 100 members of the auxiliary enjoyed the annual "President's Party."

The annual meeting of the Montgomery County auxiliary was held in May. Mrs. John H. Doane, president of the state auxiliary, was guest speaker. She stated that the Pennsylvania state auxiliary holds the largest membership in the United States.

Washington

The annual meeting of the woman's auxiliary to the Washington State Medical Association was held in Tacoma in August with Mrs. V. E. Holcombe, national president, as guest of honor. Mrs. R. E. Mosiman of Seattle, president-elect of the national auxiliary, was also present. Mrs. C. E. Sears, of Oregon, president-elect of Oregon state auxiliary, who was instrumental in the organization of the Washington state auxiliary, was a special guest. Mrs. Luman S. Roach, of Kalama, completed a successful year as state president. Mrs. George E. Hoxsey, Wenatchee, took the chair as the president for 1940-1941 and told of plans for the coming year, stressing the importance of Red Cross work and subscriptions to the *Bulletin*.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

CALIFORNIA

Physicians Tour Vineyards.—Fifty-four physicians in northern California visited some of the historic vineyards and wine cellars of the Napa Valley, October 13, on a tour sponsored by the Society of Medical Friends of Wine. The society was organized in 1939 to stimulate scientific research on wine. Officers include Drs. Thomas F. Mullen, president; Marius A. Francoz, vice president; Randolph G. Flood, secretary, and Harry E. Alderson, treasurer. All are from San Francisco.

Symposium on Heart Disease.—The eleventh annual postgraduate symposium on heart disease of the San Francisco Heart Committee will be held November 26-28. Sessions will be alternated in the hospitals of Stanford University School of Medicine and the University of California Medical School and San Francisco Hospital. The course will include demonstrations of patients presenting problems in the various types of heart disease, discussion and evaluation of specific diagnostic procedures and therapy, differential diagnosis and treatment. There will be ward rounds and special classes in x-ray, fluoroscopy and electrocardiography. At a dinner session Wednesday evening, November 27, Chauncey D. Leake, Ph.D., will discuss "Harvey, the Heart, and War" and an arrangement by Dr. Harold H. Rosenblum of "The Heart Sounds Again" will be presented. A series of forum meetings on "Public Health and Community Aspects of Heart Disease" will be held throughout the day at Mount Zion Hospital.

DELAWARE

Society News.—A symposium on chest conditions was presented before the New Castle County Medical Society in Wilmington, October 15; the speakers were Drs. Gerald A. Beatty on "Spontaneous Pneumothorax"; Harold A. Tarrant, "Presentation of Lung Changes from an Unusual Cause," and Eugene P. Pendergrass, Philadelphia, "The Healthy Chest and the Modifying Influences of Silicosis."

FLORIDA

Regional Meetings.—The fourth annual meeting of the Southeast Medical District Society was held at Coral Gables, November 2, with the following speakers, among others:

- Dr. Frederick H. Dieterich, Miami, Medicine and the Florida Criminal Law.
 - Dr. Elliott M. Hendricks, Fort Lauderdale, The Colon as a Focus of Infection.
 - Dr. Russell B. Carson, Fort Lauderdale, Pain Produced by Urologic Disease.
 - Dr. John R. Boling, Tampa, Vaginal Hysterectomy.
- Speakers at the fourth annual meeting of the Southwest Medical District in Dunedin, October 31, included:
- Dr. Alvin L. Mills, St. Petersburg, A Review of Some of the More Commonly Used Drugs in Urology.
 - Dr. David R. Kennedy, Sarasota, The Life of the Doctor.
 - Dr. Robert B. Harkness, Lake City, Occlusive Lesions of the Peripheral Blood Vessels.

At the fourth annual meeting of the South Central Medical District in Fort Pierce, November 1, the program was presented, among others, by:

- Dr. Isaac M. Hay, Melbourne, Loss of Integrity of the Radio-Ulnar Joint in Colles' Fracture.
- Dr. Duncan T. McEwan, Orlando, Perirectal Infection from the Anaerobic Streptococcus.
- Dr. Joseph S. Stewart, Miami, Some Minor Surgical Procedures.

GEORGIA

Special Society Election.—Dr. Richard E. Newberry, Atlanta, was chosen president of the Georgia Industrial Surgeons Association, succeeding Dr. Robert L. Rhodes, Augusta, at its third annual meeting in Atlanta, September 25. Other officers include Drs. Benjamin H. Minchew, Waycross, vice president, and John W. Simmons, Brunswick, secretary-treasurer.

Matas Medal Awarded to Dr. Elkin.—The Matas Award in Vascular Surgery was presented, November 14, to Dr. Daniel Collier Elkin, Joseph Brown Whitehead professor of surgery at Emory University School of Medicine, Atlanta, in recog-

nition of his work on heart wounds and aneurysms. The award was created by the Violet Hart Fund and is administered by the Tulane Educational Fund and a committee composed of Drs. Emile Bloch, Lucian H. Landry, Isidore Cohn and Edward William Alton Ochsner, New Orleans. Named in honor of Dr. Rudolph Matas, professor of general and clinical surgery emeritus, Tulane University of Louisiana School of Medicine, the medal is presented "to that North American surgeon who had contributed outstanding work in vascular surgery." The first presentation was made in 1934 to Dr. Mont R. Reid, Cincinnati, and the second in 1937 to Prof. Reynaldo dos Santos, Lisbon, Portugal. Born in Louisville, Ky., Dr. Elkin graduated at Emory University School of Medicine in 1920, joining its teaching staff three years later.

ILLINOIS

Regional Meeting of College of Physicians.—The sixth annual regional meeting of the American College of Physicians for Illinois (outside of Cook County) including members from Wisconsin, was held at Rockford, October 16. Participating were:

- Dr. Ernest E. Irons, Chicago, Aspiration Pneumonia.
- Dr. Elston L. Belknap, Milwaukee, The Responsibility of the Internist to the Field of Industrial Medicine.
- Dr. John A. Schindler, Monroe, The Clinical Importance of Various "Symptomless" Anomalies of the Gastrointestinal Tract.
- Dr. Carroll W. Osgood, Wauwatosa, Physical Aspects of Depressive Psychoses.

Personal.—Dr. Zoda D. Lunley, Wood River, has been named health officer of Roxana, succeeding the late Dr. Christian H. Diehl.—Dr. Louis H. Cohen, clinical director of the Manteno State Hospital, resigned, September 16, to accept a similar position at a state hospital in Norwich, Conn. He will be succeeded at Manteno by Dr. Louis B. Shapiro, Elgin.—The Sangamon County Medical Society gave a dinner in honor of Dr. James A. Day, Springfield, October 3, to observe his completion of fifty years in the practice of medicine. He was made a member of the Fifty Year Club of the state medical society.

Chicago

Society News.—Dr. Oliver S. Ormsby will deliver the presidential address before the twenty-fifth annual meeting of the Institute of Medicine of Chicago, December 3, on "Pelagra: Special Reference to Etiology, Cutaneous Manifestations and Treatment."—The Chicago Society of Internal Medicine will be addressed, November 25, by Drs. Fred W. Preston and Willard O. Thompson on "Persistence and Recurrence of Toxic Goiter Following Subtotal Thyroidectomy"; Raphael Isaacs, Ann Arbor, Mich., "Red Blood Cell Size as an Aid in Diagnosis, Prognosis and Treatment," and Italo F. Volini, Robert O. Levitt and Hugh B. O'Neil, "Sulfathiazole in the Treatment of Pneumococcus Pneumonia with a Comparative Study Utilizing Sulfapyridine Therapy" and "Cutaneous and Conjunctival Manifestations of Sulfathiazole Intoxication."—The Chicago Society of Allergy was addressed, October 21, by Dr. Meyer R. Lichtenstein on "The Relation of Atopy to Immunology."—A symposium on the treatment of pneumonia will be presented before the Chicago Medical Society at the Chicago Woman's Club, November 20. Dr. Gerald S. Shibley, Cleveland, will discuss "Chemotherapy" and Dr. Italo F. Volini, "Special Serum Therapy."

KENTUCKY

District Meetings.—A symposium on "Immediate Management of Emergencies" formed the program of a meeting of the sixth and seventh councilor districts of the Kentucky State Medical Association at Somerset, October 22, with the Pulaski County Medical Society as host. The speakers were Drs. Emmet F. Horine, Louisville, on "Cardiac Emergencies: Their Diagnosis and Treatment"; Robert F. Monroe, Louisville, "Postpartum Hemorrhage"; Alexander J. Alexander, Lexington, "Convulsions in Children: Differential Diagnosis and Emergency Treatment"; Augustine Thornton Scott, Lexington, "Coma: Differential Diagnosis and Emergency Treatment," and William D. Reddish, Lexington, "Automobile Accident Injuries: Their Immediate Management."—The Shelby County Medical Society was host to the fifth councilor district meeting at Shelbyville, October 17. The speakers were Drs. William S. Snyder Jr., Frankfort, on "Importance of Early Treatment for Squint"; Marinus H. Pulskamp, Louisville, "Importance of Anorectal Examination," and Emmet F. Horine, Louisville, "Indications and Contraindications for the Use of Digitalis." In the afternoon Drs. Philip F. Barbour and James H. Pritchett, Louisville, conducted a pediatric clinic.

MASSACHUSETTS

Monographs in Medicine and Public Health.—To encourage the publication of books and monographs of scientific importance by members of the Harvard Medical School and the Harvard School of Public Health, a sum of money has been provided to be used for a period of three years as a revolving publication fund. An editorial committee has been appointed to administer this fund and to select books and monographs to be included in a series entitled Harvard University Monographs in Medicine and Public Health. Members of the committee are Albert Baird Hastings, Ph.D., chairman; Drs. Walter B. Cannon, James Howard Means, Simeon Burt Wolbach and Katherine R. Drinker, executive secretary. Members of the faculties of the medical school and the school of public health who have written or who contemplate writing books or monographs suitable for such a series are invited to consult with the editorial committee and to submit their manuscripts for inclusion in the series. If financial assistance for publication of a book is required, the committee is authorized after arrangement with the Harvard University Press to use the publication fund for this purpose. To further the economical manufacture and the successful sale of books in the monograph series, the editorial committee is prepared to supply to authors, through its executive secretary, consulting advice on the proper preparation of manuscripts for publication and to make sure that announcements of books published under its auspices are widely circulated to especially interested groups. Number 1 of the Harvard University Monographs in Medicine and Public Health, to be published this month by the Harvard University Press, will be "The Endocrine Function of Iodine" by Dr. William T. Salter. Additional titles, now in prospect, will be announced later.

NEBRASKA

Personal.—Dr. David C. Hilton, Lincoln, a colonel in the Nebraska National Guard, has been placed on the inactive list with the rank of brigadier general. Dr. Hilton requested the change of status, as he is nearing the retirement age, according to the *Nebraska State Medical Journal*. He helped to organize the 110th Medical Regiment of the state unit in 1923. At that time he was commissioned a lieutenant colonel and later was promoted to a full colonelcy and placed in command of the regiment.

District Meeting.—The annual meeting of the Seventh Councilor District Medical Society was held in Geneva, October 17. Scientific speakers, all of Omaha, were Drs. Esley J. Kirk on "Correlation of the Physiological and Chemical Changes in Nephritis and Their Relation to Treatment"; John Harry Murphy, "Poliomyelitis—Diagnosis and Treatment," and Maine C. Andersen, "Practical Application of Heart Tracings." Drs. Clayton F. Andrews, Lincoln, and William P. Wherry, Omaha, president and president-elect of the Nebraska State Medical Association, spoke at an evening session.

NEW JERSEY

The Martland Lecture.—The sixth annual Harrison S. Martland Lecture, sponsored by the Essex County Anatomical and Pathological Society, will be presented at the Academy of Medicine of Northern New Jersey, Newark, November 29, by Dr. William Boyd, professor of pathology and bacteriology, University of Toronto Faculty of Medicine. Dr. Boyd's subject will be "Recent Increase in Bronchial Carcinoma."

Annual Clinical Conference.—The Medical Society of New Jersey will hold its third annual clinical conference in Essex County hospitals, November 27-28, on the general theme of "The General Practitioner." There will be one program of scientific papers at the Academy of Medicine of Northern New Jersey, Newark, Wednesday afternoon, November 27, with the following speakers, all of Newark:

- Dr. Harrison S. Martland, The Pathologist and the General Practitioner.
- Dr. Henry H. Kessler, Evaluation of Disability in Industrial Accidents.
- Dr. Elmer G. Wherry, Prematurity.
- Dr. William L. James, The Sulfanilamide Group in Treatment of Gonorrhea.

The annual dinner will be held Wednesday evening at the Newark Athletic Club, with Dr. William J. Carrington, Atlantic City, as toastmaster and Harold Major, D.D., as the principal speaker, on "The Future of America." Drs. Harry N. Comando, Newark, president of the Essex County Medical Society, and Watson B. Morris, Springfield, president of the Medical Society of New Jersey, will also speak.

NEW YORK

Annual Health Supplement.—The Third Annual Health Supplement, prepared in cooperation with the Medical Society of the County of Nassau, was published, October 29, by the *Nassau Daily Review-Star*, Rockville Centre, New York. Consisting of forty pages in tabloid form, the supplement is devoted chiefly to the various aspects of medical preparedness. It includes articles outlining the preparedness activities of the Medical Society of the State of New York, the Nassau County Society and the American Medical Association. In an editorial entitled "Health—for Preparedness," the paper says:

Last year our Health Supplement urged people to care for their health because they owed it to themselves. This year we are beginning to see that good health is something our people owe not only to themselves but also to their country. In the days to come the worker in our factory, the civil servant, the man who handles our transportation and our communication, yes, and the man and woman who work to "keep the home fires burning" will be just as important in the common cause as the pilot of a bomber, the man who directs an anti-aircraft gun or the soldier who digs a trench. It mustn't be said that America failed because her people neglected the priceless heritage of health.

New York City

Fellowship Available for Latin-American Physician.—Mount Sinai Hospital announces that a fellowship has been established to enable physicians from the Latin-American countries to receive graduate training at this hospital. The Dazian Foundation for Medical Research has provided a grant of a sum up to \$2,000 for the stipend, which will include the cost of travel. The holder will be known as the Dazian Fellow. The fellow may arrange to serve in any of the clinical or laboratory departments of the hospital, the choice depending on the needs and wishes of the physician selected for the position. Application forms may be obtained by addressing the director of the hospital, Dr. Joseph Turner, Mount Sinai Hospital, Fifth Avenue and One Hundredth Street, New York. Qualifications of applicants will be reviewed by the hospital's committee on fellowships and the candidate will be notified in due time.

Medal and Cancer Poster Prizes Awarded.—Dr. James Ewing, director emeritus and consulting pathologist of Memorial Hospital for the Treatment of Cancer and Allied Diseases, received the Clement Cleveland Medal of the New York City Cancer Committee at its fourteenth annual dinner, October 30. At the same time prizes were awarded in the poster contest conducted by the National Alliance of Art and Industry for the American Society for the Control of Cancer. The first prize of \$1,000 went to a young Viennese refugee artist, Henry Koerner. Mrs. Robert G. Mead, who established the medal award in 1937 in memory of her father, the late Dr. Cleveland, made the presentation to Dr. Ewing, who responded with an address. Rear Admiral Ralph Whitman (C. E. C.), U. S. Navy, made an address on "Health for Defense." Clarence C. Little, Sc.D., managing director of the American Society for the Control of Cancer, presented the prizes for the poster contest. In addition to the first prize to Mr. Koerner, prizes of \$500, \$250, \$50, \$25 and five of \$10 each were awarded.

OKLAHOMA

Society News.—Dr. Otto Jason Dixon, Kansas City, Mo., will address the Tulsa County Medical Society, Tulsa, November 25, on "An Operation for the Correction of Deafness."

—Dr. John M. Carson, Shawnee, discussed common rectal lesions at a meeting of the Pottawatomie County Medical Society, October 19, in Shawnee.—Dr. Paul B. Champlin, Enid, addressed the Garfield County Medical Society, Enid, October 24, on "Papillary Cystadenoma of the Ovary" and Drs. Frank T. Joyce and Charles J. Roberts discussed electrocardiography.

Public Health Association Meeting.—The annual meeting of the Oklahoma Public Health Association was held in Tulsa, October 3-4. The speakers included Clair E. Turner, Dr. P.H., professor of public health education at Massachusetts Institute of Technology, Cambridge, on "The Trend of School Health Education"; Miss Katherine Lenroot, chief of the Children's Bureau, Washington, D. C., "The Future of the Public Health Worker" and Dr. Henry H. Turner, Oklahoma City, president of the Oklahoma State Medical Association, "Public Health, A New Essential to Organized Medicine." Mr. Burley Walker of the staff of the state department of health was elected chairman.

OREGON

Annual Registration Due December 1.—All practitioners of medicine and surgery holding licenses to practice in Oregon are required by law to register annually on or before December 1 with the secretary of the state board of medical examiners and at that time to pay a fee of \$5. A practitioner failing to register is subject to a penalty of \$1 for each thirty days, or part thereof, of default and his failure to register within ninety days after December 1 is a misdemeanor.

PENNSYLVANIA

Society News.—Dr. William D. Whitehead, Scranton, addressed the Montour County Medical Society, Danville, October 18, on "Contact Dermatitis."—Dr. Edward L. Bauer, Philadelphia, addressed the Delaware County Medical Society, Chester, October 10, on "An Immunizing Program Against Communicable Diseases in Childhood for the Family Physician."—Dr. Claude Merrill Leister, Bethlehem, addressed the Northampton County Medical Society, October 18, on "Observations on Children's Blood."—Dr. John P. Henry, Pittsburgh, addressed the Washington County Medical Society, Washington, October 9, on "Diseases of the Peripheral Arteries and Veins."—Dr. Ralph R. Mellon, Pittsburgh, addressed the Westmoreland County Medical Society, Greensburg, October 15, on "Physiologic and Therapeutic Consideration of Sulfanilamide, Sulfapyridine and Sulfathiazole."

Pittsburgh

Fifth Renziehausen Lecture.—Dr. Cyril N. H. Long, Sterling professor of physiological chemistry, Yale University School of Medicine, New Haven, Conn., will deliver the fifth Renziehausen Memorial Lecture at the meeting of the Allegheny County Medical Society, November 19. His subject will be "The Endocrine Control of Metabolism."

PUERTO RICO

Inter-American Hospital Institute.—The first Inter-American Institute of Hospital Administrators will be held in San Juan, December 1-14, with headquarters at the Hotel Condado and sessions at the School of Tropical Medicine of the University of Puerto Rico. Invitations have been sent to hospital administrators and assistant administrators and heads of administrative departments throughout the Americas. Among those who will lecture are:

- Dr. Eduardo Garrido Morales, San Juan, commissioner of health of Puerto Rico.
- Dr. Malcolm T. MacEachern, associate director, American College of Surgeons, Chicago.
- Dr. Leopoldo Figueroa Carreras, San Juan, president of the Territorial Charities Board of Puerto Rico.
- Dr. Bert W. Caldwell, executive secretary, American Hospital Association, Chicago.
- Dr. Arthur C. Bachmeyer, director of clinics, University of Chicago.
- Julio B. Ortiz, Ph.D., dean, College of Business Administration, University of Puerto Rico.
- Mr. James A. Hamilton, director of the New Haven Hospital, New Haven, Conn.
- Mr. Félix Lamela, administrator, University Hospital, San Juan.
- Dr. José Rodríguez Pastor, chief, bureau of tuberculosis, Department of Health, San Juan.
- Dr. Ramón Señeriz, director, Bayamón District Hospital.

The institute is sponsored by the American College of Hospital Administrators and the American Hospital Association, in cooperation with the University of Puerto Rico and its School of Tropical Medicine; the Insular Department of Health, the Puerto Rico Medical Association, the Territorial Charities Board and the Puerto Rico Hospital Council.

GENERAL

Academy of Pediatrics.—The tenth annual meeting of the American Academy of Pediatrics will be held at the Hotel Peabody, Memphis, Tenn., November 18-20. Dr. Edwin E. Osgood, Portland, Ore., will open the scientific program with a talk on "Chemotherapy of Staphylococcus Infections." A symposium on virus diseases will then be presented by Fred D. Stimpert, Ph.D., Detroit; Dr. Ernest W. Goodpasture, Nashville, Tenn., and Dr. Joseph Stokes Jr., Philadelphia. Round table discussions will be devoted to the following subjects: anemias of infancy; appraisal of quarantine requirements; causes and treatment of behavior problems in children; diarrhea and dysentery; infant feeding; intestinal parasites; malaria; methods of improving pediatric practice; neonatal asphyxia; what's wrong with my child's feet; adiposogenital dystrophy; allergy; chemotherapy; treatment of pneumonia in children; vitamins from the standpoint of the practicing pediatrician, and methods of improving pediatric practice.

Southwestern Medical Association.—The annual meeting and clinical conference of the Southwestern Medical Association will be held in Tucson, Ariz., November 21-23, under the presidency of Dr. Orville E. Egbert, El Paso, Texas. Headquarters will be at the Pioneer Hotel. Guest speakers who will give several addresses each at general assemblies and section meetings are:

- Dr. George E. Fahr, professor of internal medicine, University of Minnesota Medical School, Minneapolis.
- Dr. Richard B. Cattell, Lahey Clinic, Boston.
- Dr. Thomas T. Mackie, assistant clinical professor of medicine, Columbia University College of Physicians and Surgeons, New York.
- Dr. John S. Lundy, section on anesthesia, Mayo Clinic, Rochester, Minn.
- Dr. Willard M. Allen, professor of obstetrics and gynecology, Washington University School of Medicine, St. Louis.
- Dr. Carleton Mathewson Jr., associate professor of surgery, Stanford University School of Medicine, San Francisco.
- Dr. William L. Benedict, professor of ophthalmology, University of Minnesota Graduate School of Medicine, Mayo Foundation, Rochester.

There will also be a meeting of the Southwestern Academy of Eye, Ear, Nose and Throat with Dr. Benedict and Dr. Horace G. Merrill, San Diego, Calif., as guest speakers.

Specialty Board Examinations.—The American Board of Obstetrics and Gynecology announces that a written examination and review of case histories (Part I) for Group B candidates will be held in various cities of the United States and Canada Jan. 4, 1941. Notice of the place will be sent to each candidate in advance. Candidates who complete this examination proceed to the Part II examination to be held for all candidates in Cleveland, May 28 to June 1, 1941, immediately preceding the annual session of the American Medical Association. Applications for admission to Group A (Part II) examinations must be on file in the secretary's office not later than March 15. After January 1942 there will be only one classification of candidates and all will be required to take the Part I and Part II examinations. The board announces a change in the case record ruling, effective Jan. 1, 1942. This ruling should now read "It is preferable that the number of cases submitted should not be more than half (25) of the total number of fifty (50) cases required." For further information and application blanks, address Dr. Paul Titus, secretary, 1015 Highland Building, Pittsburgh.

Fellowships from the Lalor Foundation.—Six fellowship awards in chemistry will be granted by the Lalor Foundation for the academic year 1941-1942, four postdoctorate awards of \$2,000 each and two awards of \$2,500 each. The recipients must have the equivalent of a Ph.D. degree and the applicants will be judged by their previous training, demonstrated competence and promise in their special fields. The selection of fellows has been assigned to six chemists, each of whom will choose the holder of the award for his institution. The judges are: Roger Adams, Ph.D., University of Illinois, Urbana; Hans Clarke, D.Sc., Columbia University, New York; Frederick G. Keyes, Sc.D., Massachusetts Institute of Technology, Cambridge; Charles A. Kraus, Ph.D., Brown University, Providence, R. I.; Arthur B. Lamb, Ph.D., Harvard University, Cambridge, and Dr. Eli Kennerly Marshall Jr., Johns Hopkins University School of Medicine, Baltimore. Detailed information and application forms may be obtained by addressing Charles Lalor Burdick, Ph.D., secretary of the Lalor Foundation, Wilmington, Del., or by direct communication with one of the chemists named. Applications should be filed before December 31.

Government Services

Committees to Consider Industrial Health

The U. S. Department of Labor has announced the appointment of four committees to consider accident, health, compensation and housing problems in the tri-state mining district of Missouri, Kansas and Oklahoma. According to a release from the department, this is a leading area in the mining of zinc and lead. The committees will work out a joint program for remedial action for the better control of work hazards, particularly in reference to silicosis exposure and for improvement in the living conditions of miners. Jeff A. Robertson, commissioner, Kansas Department of Labor, is chairman of the committee on mine hazard control; Dr. Fred P. Helm, Topeka, secretary and executive health officer, Kansas State Board of Health, chairman of the committee on social and health problems; Associate Justice William A. Smith, Supreme Court of Kansas, chairman of the committee on workmen's compensation, and John A. Robinson, Miami, Okla., chairman of the committee on housing. V. A. Zimmer, U. S. Department of Labor, is the coordinating and liaison officer.

Foreign Letters**BUENOS AIRES**

(From Our Regular Correspondent)

Oct. 11, 1940.

Control of Venereal Diseases in Argentina

The report of Dr. José J. Puente, in charge of the division of venereal disease and leprosy control of the national health department in Buenos Aires, presented at the eighth American Scientific Congress in Washington last May, has been published. Argentine legislation dealing with social diseases has been in force for about three years. According to the law, every hospital is to be equipped to treat venereal diseases. This provision has now largely been put into effect except in a few institutions for the chronic ill such as those for tuberculosis and leprosy. There are at present 709 antivenereal "servicios" in a total of 873 hospitals, representing an increase of 139 since the law went into effect. Calculated on population density, this represents one antivenereal welfare service for every 18,000 inhabitants. Most venereal diseases were found in certain regions in the northern part of the country, observations which are in accord with army statistics. Under the law every organization with fifty or more employees is compelled to maintain, without cost to the worker, a center for antivenereal prophylaxis and treatments. Where more than 100 workers are employed, the installation of a resident physician may be demanded. All large commercial and industrial concerns have organized a medical service of this kind. However, the law has not been in all cases rigorously enforced.

Prompt initial treatment and long continued subsequent attention have proved their worth. Systematic examinations for syphilis have not yet been undertaken in such a way as to determine the advantages of the procedure, but it is the general impression of physicians that more serious secondary effects, relapses and delayed manifestations of visceral and nervous phenomena may thereby be prevented. In gonorrhea, sulfon-

TABLE 1.—Primary and Secondary Syphilitic Infections

	1934	1935	1936	1937	1938	1939
University clinic for venereal diseases in Buenos Aires (only fresh cases)...	104	96	87	67	52	32
Three dispensaries in the harbor area, Buenos Aires.....	480	497	513	338	234	103
Nineteen public aid dispensaries, Buenos Aires.....	1,660	1,636	1,333	1,141	834	319
Nine dispensaries in interior of country.....	1,765	1,653	1,669	1204	881	756

amide derivatives have more recently been employed. In chancroid the dmecos type vaccines are used; in some cases sulfonamide derivatives have also been tried. Lymphogranulomatosis is treated with antimony preparations, antigen injections and sulfonamide derivatives. Favorable results have been obtained with antimony and surgical excision in a few cases of venereal granuloma.

Complete statistics for venereal morbidity are not available. The figures given in table 1, however, indicate the reduction in new infections.

Since the law governing the control of venereal disease went into effect in May 1937, a significant, almost parallel, downward trend has been noted in all four groups (table 2). Accordingly, the incidence of chancroid and gonorrhea is lower, at least in Buenos Aires. Venereal lymphogranulomatosis, which had mounted during 1932-1937, seems to have lost its intensity. The majority of cases were found in the hospitals of Buenos Aires, the large cities of the interior, the harbor areas and the subtropical regions.

The significant recession in venereal morbidity is attributed to the intensified antivenereal campaign, the abolition of prosti-

tution and the greater interest in personal prophylaxis. Army observations of recruits reflected in the subjoined figures confirm this: 1935, 1.11 per cent; 1936, 0.90 per cent; 1937, 0.86 per cent; 1938, 0.60 per cent; 1939, 0.65 per cent, and 1940, 49 per cent.

The explanation of the correlation between the abolition of prostitution and the decline of venereal diseases is sought in reduced promiscuity of sexual intercourse and, in consequence, in fewer opportunities for infection. The social effects of the abolition of prostitution were fiercely debated at the time the law was shaped. Statistics, however, for Buenos Aires do

TABLE 2.—Downward Trend in Chancroid and Acute Gonorrhea

	Incidence of Chancroid					
	1934	1935	1936	1937	1938	1939
University clinic.....	19	108	47	11	8	5
Harbor area (three dispensaries).....	114	229	131	62	34	8
Public aid (nineteen dispensaries).....	704	1,698	616	150	36	17
Nine dispensaries in interior.....	141	280	349	258	34	46

	Acute Gonorrhea					
	1934	1935	1936	1937	1938	1939
University clinic.....				No report		
Harbor area (three dispensaries).....	709	833	912	683	763	610
Public aid (nineteen dispensaries).....	6,993	6,014	5,111	4,470	3,676	3,339
Nine dispensaries in interior.....	1,331	1,526	1,625	1,574	1,437	1,434

not confirm the fears entertained. Lack of funds has prevented as thorough an investigation of the sources of infection as is desirable, but wherever this could be done the favorable effects became promptly manifest.

Higher Institute of University Culture

A bill has been introduced in the Argentine chamber of deputies for the founding of an institute that is to disseminate theoretical and practical information, especially for the benefit of physicians and to enable them to keep abreast of medical progress in the various branches of medicine in areas of the country where no university facilities are available. The institute is to be founded in Rosario, the second largest city of Argentina, under the control of the faculties of medicine of the country. The teaching personnel is to be drawn from the university staff and from physicians of scientific ability. The salary is to total 1,500 Argentine pesos (about \$450) per month. The annual budget for the institute is set at 150,000 pesos (about \$45,000). The underlying purpose of the plan is to afford post-graduate training to physicians who graduate from medical schools to practice in the interior. The demand on the isolated physician of the interior for a knowledge of special technics is greater than on his urban colleague. The institute is also to serve as a center of cooperation among physicians for the study of epidemics and their control. This again might serve to induce more physicians to practice in the interior and thus to aid the distribution of medical services away from the cities.

Marriages

KEITH WILLIAM MCFATRIDGE, Roxton, Texas, to Miss Margaret Daniel of Tuscaloosa, Ala., in September.

PETER CHARLES GAILLARD JR., Eutawville, S. C., to Miss Deane D. Shumate in Charleston, July 19.

JOHN R. CORKERY JR., Spokane, Wash., to Miss Margery Bordelon of Cottonport, La., in August.

JAMES CLAY WREN, Siler City, N. C., to Miss Edna Lynette Decker of Haworth, N. J., recently.

ROBERT W. SCHNEIDER, Cleveland, to Miss Marjorie Ann Rollin of Milwaukee in July.

FRANK HARMS, Aberdeen, Wash., to Miss Lois Kleiwer of Newport, September 7.

HARRY D. PASS to Miss Helen Thal, both of Seattle, August 20.

Deaths

Arthur Caradoc Morgan * Philadelphia; Medico-Chirurgical College of Philadelphia, 1897; member of the House of Delegates of the American Medical Association in 1911 and from 1929 to 1938; became a member of the faculty at his alma mater in 1898 and served until the school was taken over in 1916 by the University of Pennsylvania to be developed as a graduate school; in the new school was associate professor of medicine from 1916 to 1922 and for several years was associate in medicine in the undergraduate department of the university; in 1922 went to Temple University School of Medicine as professor of applied therapeutics, remaining in that chair till 1928; emeritus professor of clinical medicine since 1930; fellow of the American College of Physicians; was president of the Philadelphia County Medical Society and the Medical Society of the State of Pennsylvania; formerly member of the state board of medical education and licensure; hospital affiliations included the Frankford Hospital, of which he was physician in chief and medical director for eight years, and the Medico-Chirurgical, Polyclinic, Samaritan and Garretson hospitals, where he had been at various times visiting physician; attending physician to the tuberculosis department of the Philadelphia General Hospital for many years; on the staff of the Eastern State Penitentiary Hospital; served during the World War; associate editor of the *Pennsylvania Medical Journal*; aged 70; died, October 21, in the Temple University Hospital of coronary occlusion.

Edward Everett Cornwall * Brooklyn; College of Physicians and Surgeons, medical department of Columbia College, New York, 1890; one of the incorporators, ex-councilor and fellow of the American College of Physicians; member of the House of Delegates of the American Medical Association, 1911-1912; attending emeritus and consulting physician, Norwegian Lutheran Deaconesses' Home and Hospital; consulting physician, St. John's, Bethany Deaconess and Brooklyn Eye and Ear hospitals, Brooklyn, and the Southside Hospital, Bay Shore; author of "Clinical Treatise on Diseases of the Heart"; aged 74; died, October 6, of coronary thrombosis.

Louis P. H. Bahrenburg * Medical Director, United States Public Health Service, Cleveland Heights, Ohio; Western Reserve University Medical Department, Cleveland, 1896; fellow of the American College of Surgeons; was commissioned in the United States Public Health Service as an assistant surgeon in 1900; subsequently was promoted through the various grades to the grade of medical director (ranking as colonel) in 1930 and was retired for age on Dec. 31, 1937; aged 66; died in October at Pemberville, Ohio.

Frederick William Zimmer, Rochester, N. Y.; University of Pennsylvania Department of Medicine, Philadelphia, 1882; member of the Medical Society of the State of New York; fellow of the American College of Surgeons; for many years medical consultant to the city school board; consulting surgeon, Rochester General, Rochester State, Park Avenue and Genesee hospitals; aged 82; died, September 21, of chronic cardiovascular renal disease.

Herbert Leroy Odell * Sharon Springs, N. Y.; Albany Medical College, 1883; secretary and past president of the Schoharie County Medical Society; past president and secretary of the Schoharie County Tuberculosis and Public Health Association; for many years president of the school board and health officer of the village of Sharon Springs; aged 81; died, September 27, of arteriosclerosis.

Charles Browning Williams, Philippi, W. Va.; University of Virginia Department of Medicine, Charlottesville, 1895; member of the West Virginia State Medical Association; served during the World War; formerly bank president; on the staffs of the Myers Clinic Hospital, Philippi, and the Union Protestant Hospital, Clarksburg; aged 68; died, September 9, of pulmonary tuberculosis.

Alfred Joseph Helton, Yakima, Wash.; Rush Medical College, Chicago, 1902; member of the Washington State Medical Association and the American Association for the Surgery of Trauma; fellow of the American College of Surgeons; served during the World War; surgeon to St. Elizabeth's Hospital; aged 63; died, September 25, of cerebral hemorrhage.

Rudolph John Horvath, New York; Magyar Királyi Pázmány Petrus Tudományegyetem Orvosi Fakultasa, Budapest, 1912; member of the Medical Society of the State of New York; served during the World War; on the staff of the Beekman Hospital and the Mount Sinai Hospital; aged 54; died, September 28, of coronary thrombosis.

Lillian Ethel Taylor, Carmel, Calif.; University of Toronto Faculty of Medicine, Toronto, Ont., Canada, 1906; member of the American Academy of Ophthalmology and Otolaryngology; formerly on the staff of the Women and Children's Hospital, Chicago; died, September 26, of coronary thrombosis.

Richard Andrew Lawrence, Albany, N. Y.; Albany Medical College, 1907; member of the Medical Society of the State of New York; on the staffs of the Brady Maternity Home and St. Peter's Hospital; aged 58; died, September 28, of dissecting aneurysm of the thoracic and abdominal aorta.

Pleasant Leonidas Moon, Atlanta, Ga.; Atlanta Medical College, 1897; member of the Medical Association of Georgia; on the staffs of the Georgia Baptist Hospital and the Crawford W. Long Memorial Hospital; aged 71; died, September 22, in Pierson, Fla., of coronary thrombosis.

Sidney Solomon Oppenheimer * Spokane, Wash.; McGill University Faculty of Medicine, Montreal, Que., Canada, 1898; fellow of the American College of Surgeons; aged 67; for many years on the staff of the Sacred Heart Hospital, where he died, September 20, of cerebral thrombosis.

John Irwin Gaston, Shawnee, Okla.; Chattanooga (Tenn.) Medical College, 1905; member of the Oklahoma State Medical Association; past president of the Pottawatomie County Medical Society; formerly county health officer; aged 63; died, September 24, of coronary thrombosis.

Eugene Baker, Ithaca, N. Y.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1882; member of the Medical Society of the State of New York; past president of the Tompkins County Medical Society; aged 87; died, October 14, of arteriosclerosis.

Nicholas C. Baumann, Highland, Ill.; Eclectic Medical Institute, Cincinnati, 1904; member of the Illinois State Medical Society; past president of the Madison County Medical Society; on the staff of St. Joseph Hospital; aged 64; died, October 13, of cerebral hemorrhage.

George H. Bolling, Pittsburgh; Howard University College of Medicine, Washington, D. C., 1904; member of the Medical Society of the State of Pennsylvania; aged 68; died, October 3, in the Western Pennsylvania Hospital of carcinoma of the esophagus.

Charles Burton Wormelle, Boston; Harvard Medical School, Boston, 1898; member of the Massachusetts Medical Society; formerly on the staffs of the City Hospital and the Children's Hospital; aged 68; died, September 16, of carcinoma of the stomach.

Albert Monroe Sittler, Bowmanstown, Pa.; Jefferson Medical College of Philadelphia, 1886; member of the Medical Society of the State of Pennsylvania; aged 76; died, October 2, in the Palmerton (Pa.) Hospital of cerebral embolism and pneumonia.

David F. Thompson, Toledo, Ohio; College of Physicians and Surgeons, medical department of Columbia College, New York, 1869; aged 93; died, September 20, in St. Vincent's Hospital of a fracture of the hip due to a fall and bronchopneumonia.

Robinson Leroy Bidwell * Toledo, Ohio; Starling-Ohio Medical College, Columbus, 1908; fellow of the American College of Surgeons; surgeon, St. Vincent's and Women's and Children's hospitals; aged 56; died, September 26, of coronary sclerosis.

J. A. Moyers, Franklin, W. Va.; St. Louis College of Physicians and Surgeons, 1899; member of the West Virginia State Medical Association; aged 68; died, September 1, at a hospital in Harrisonburg, Va., of inoperable carcinoma of the stomach.

Joseph Daniel Slack * New York; Columbia University College of Physicians and Surgeons, New York, 1904; on the staff of the Union Hospital; aged 59; died, September 7, in St. Luke's Hospital, New Bedford, Mass., of bronchopneumonia.

Martin Barbour Williams, Centerville, Ala.; Birmingham Medical College, 1907; member of the Medical Association of the State of Alabama; secretary of the Bibb County Medical Society; aged 62; died, September 28, of cerebral hemorrhage.

John Edward Di Giglia * Lake Charles, La.; Tulane University of Louisiana School of Medicine, New Orleans, 1934; aged 30; on the staff of St. Patrick Hospital, where he died, September 22, of empyema and lung abscess.

Joseph Curry Allgood, Summerfield, La.; Louisville (Ky.) Medical College, 1894; member of the Louisiana State Medical Society; past president of the Claiborne Parish Medical Society; aged 69; died, September 27, of coronary thrombosis.

George Francis Rogan, Medina, N. Y.; Albany Medical College, 1893; member of the Medical Society of the State of New York; on the staff of the Medina Memorial Hospital; aged 70; died, October 2, of cerebral thrombosis.

Benjamin Escoe, New York; New York Homeopathic Medical College and Flower Hospital, New York, 1929; aged 39; died, September 22, in the Mount Sinai Hospital of hemolytic anemia following sulfapyridine therapy.

Thomas Freeman Howell, Alamosa, Colo.; University of Kansas School of Medicine, Kansas City, 1906; member of the Colorado State Medical Society; aged 68; died, September 24, in Salida of carcinoma of the prostate.

Ward Clifton Zeller, Visalia, Calif.; Ohio Medical University, Columbus, 1897; member of the California Medical Association; served during the World War; aged 66; died, September 26, of chronic myocarditis.

Michael James Rowe, Bridgeport, Conn.; College of Physicians and Surgeons, Baltimore, 1896; veteran of the Spanish-American War; aged 73; died, September 30, of cystitis, pyelitis and bladder and kidney stones.

John Ollie Hudson, Braman, Okla.; University of Nashville (Tenn.) Medical Department, 1910; member of the Oklahoma State Medical Association; aged 54; died, September 27, in Blackwell of cardiorenal disease.

George Brinton Woods, Curllsville, Pa.; College of Physicians and Surgeons, Baltimore, 1887; member of the Medical Society of the State of Pennsylvania; aged 77; died, September 29, of cerebral hemorrhage.

Joseph Michael Hilger, Iona, Minn.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1903; aged 60; died, September 4, of cerebral hemorrhage and hypertension.

Henry Clay Jarvis, Schell City, Mo.; Bennett College of Eclectic Medicine and Surgery, Chicago, 1882; University Medical College of Kansas City, Mo., 1901; aged 91; died, September 29, of coronary sclerosis.

Harry Preston Gibson, Leesburg, Va.; University of the South Medical Department, Sewanee, Tenn., 1909; member of the Medical Society of Virginia; aged 55; died, October 2, of cirrhosis of the liver.

Reginald Gilbert Bray, Niagara Falls, N. Y.; University of Vermont College of Medicine, Burlington, 1895; aged 81; died, October 5, of hemorrhage and ruptured aneurysm of the abdominal aorta.

Jacobum Phillipe Roulier, Salem, Mass.; School of Medicine and Surgery of Montreal, Que., Canada, 1888; aged 79; died, August 9, in the Beverly (Mass.) Hospital of cerebral hemorrhage.

Henry Ledbetter Flake, Leland, Miss.; Kentucky School of Medicine, Louisville, 1889; aged 73; died, September 29, in the King's Daughters Hospital, Greenville, of carcinoma of the stomach.

James Washington Benton, Peniel, Texas; Kentucky School of Medicine, Louisville, 1906; member of the State Medical Association of Texas; aged 79; died, September 29, of uremia.

George Henry Rawson, Washington, D. C.; George Washington University School of Medicine, Washington, 1918; aged 57; died, October 2, in Arlington, Va., of cardiac infarction.

Edwin Nichols Jr., Scottsbluff, Neb.; Starling Medical College, Columbus, 1894; aged 72; died, September 20, in the West Nebraska Methodist Episcopal Hospital of pneumonia.

Robert Lorain Smith, Syracuse, N. Y.; University of the City of New York Medical Department, 1892; aged 68; died, August 16, in Farmingdale, N. J., of coronary thrombosis.

George Massalon Murray, Atlanta, Ga.; University of Virginia Department of Medicine, Charlottesville, 1909; aged 66; died, September 14, of myocarditis and influenza.

Clarke Sherwood Smith, Oakland, Calif.; University of Minnesota College of Medicine and Surgery, Minneapolis, 1908; aged 51; died, September 18, of coronary occlusion.

Arthur Thomas, Portland, Ore.; Physio-Medical College of Indiana, Indianapolis, 1895; veteran of the Spanish-American War; aged 72; died, September 14, of pneumonia.

Maurice Carlisle McKain, Columbus, Ind.; Indiana University School of Medicine, Indianapolis, 1918; aged 48; was killed, September 25, in an automobile accident.

William Golliday O'Neal, Grenada, Miss.; Meharry Medical College of Walden University, Nashville, Tenn., 1903; aged 65; died, August 16, of carcinoma of the kidney.

Charles Edgar Keeler, Yakima, Wash.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1904; aged 68; died, August 10, of myocarditis.

Harry Leonard Baer, Pittsburgh; University of Pittsburgh School of Medicine, 1917; served during the World War; aged 47; died, October 3, of coronary disease.

Gabriel Toombs Spearman, Mercedes, Texas; University of Georgia Medical Department, Augusta, 1900; aged 67; died, September 19, of sarcoma of the intestine.

Cora Millet Holden, Mentor, Ohio; Woman's Medical College of Pennsylvania, Philadelphia, 1882; aged 87; died, September 10, of carcinoma of the stomach.

Cesare Mondini, Brooklyn; Regia Università degli Studi di Palermo Facoltà di Medicina e Chirurgia, Italy, 1888; aged 78; died, September 22, of cerebral hemorrhage.

Howard Davis Lewis, Sunbury, Pa.; University of Maryland School of Medicine, Baltimore, 1900; aged 62; died, October 2, of a self-inflicted bullet wound.

Samuel Edwin Walker, Somers Point, N. J.; Jefferson Medical College of Philadelphia, 1882; aged 86; died, September 6, of hypostatic pneumonia and senility.

R. Brent Murphy, St. Louis; St. Louis Medical College, 1889; an Affiliate Fellow of the American Medical Association; aged 73; died, September 26, of carcinoma.

William F. Haley, Chicago; Chicago Homeopathic Medical College, 1889; aged 78; died, September 18, in Marion, Ohio, of arteriosclerosis and cerebral thrombosis.

Thomas Lewis Bowers, London, Ky.; Vanderbilt University School of Medicine, Nashville, Tenn., 1894; aged 74; died, October 16, of cerebral hemorrhage.

Leonidas F. Smith, Lindale, Ga.; Vanderbilt University School of Medicine, Nashville, Tenn., 1892; aged 72; died, September 20, in Rome of heart disease.

Victor A. Young, Duluth, Minn.; Minneapolis College of Physicians and Surgeons, 1903; aged 65; died, September 20, of coronary sclerosis and hypertension.

Calvin Brobst Knerr, Philadelphia; Hahnemann Medical College of Philadelphia, 1869; aged 93; died, September 29, of bronchopneumonia and myocarditis.

Lester Barrett Klippel, Rochester, N. Y.; Syracuse University College of Medicine, 1919; aged 46; died, September 28, of coronary thrombosis.

William H. O'Malley, Kewanee, Ill.; College of Physicians and Surgeons of Chicago, 1893; aged 72; died in September of coronary thrombosis.

Collin Henly Wilcox, Daytona Beach, Fla.; Rush Medical College, Chicago, 1888; aged 76; died, September 8, of pneumonia and hemiplegia.

George Washington Olive, Berry, Ala.; Medical College of Alabama, Mobile, 1888; aged 78; died, September 23, of chronic myocarditis.

Arthur Louis Barton, Los Angeles; Colorado School of Medicine, Boulder, 1897; aged 67; died, October 1, in an automobile accident.

Allen D. Johnson, Atlanta, Ga.; Georgia College of Eclectic Medicine and Surgery, Atlanta, 1881; aged 86; died, September 20, of senility.

Alfred W. Z. Thompson, Yakima, Wash.; University of Oregon Medical School, Portland, 1913; aged 61; died, August 17, of uremia.

Ralph Clarke Williams, East Quogue, N. Y.; Trinity Medical College, Toronto, Ont., Canada, 1898; aged 64; died, September 3.

John Henry Tilden, Denver; Eclectic Medical Institute, Cincinnati, 1872; aged 89; died, September 1, of carcinoma of the bladder.

Harry Daniel Hopkins, Waterbury, Vt.; Baltimore Medical College, 1901; aged 62; died, October 2, of coronary thrombosis.

Rudolph J. Lange, Lansing, Mich.; Saginaw (Mich.) Valley Medical College, 1903; aged 61; died, September 18, of myocarditis.

Wolf Maslon, Brooklyn; Eclectic Medical College of the City of New York, 1897; aged 73; died, September 10, of acute anemia.

Sherrill L. Mitchell, Rolla, Mo. (licensed in Missouri in 1884); aged 78; died, September 30, of myasthenia gravis.

Bureau of Investigation

A PROMINENT IMPOSTOR

Koba-Kuba Shows Up as Matsuzaka

In THE JOURNAL for Aug. 1, 1931, page 339, the Bureau of Investigation published an article entitled "The Case of Koba, Alias Kuba." In this article it was pointed out that Tsuneyoshi Koba, sometimes referred to as L. (Lawrence) Tsuneyoshi Koba, was born in Japan in 1900 and came to the United States in 1914, graduated from the Seattle High School in 1919 and obtained a B.S. degree from Columbia University in 1924. He then enrolled in the freshman class at Johns Hopkins University School of Medicine for the 1924-1925 session but in June 1925 was dropped from that school for failures and poor standing. Subsequently he displayed forged credentials from Johns Hopkins University, including a forged diploma, and in 1929 imposed on three New York hospitals by means of these false credentials. In 1930 he attempted to present them to the California state authorities but, because of their activities, left the state hurriedly when faced with prosecution for filing fraudulent credentials from Johns Hopkins University. The California

cancer-cure concern known as "Dr. Williams' Sanatorium." Later he related in Minneapolis that he was being persecuted by Williams and that a man named Tsuneyoshi Koba had been going around the country posing as a physician and that he had been mistaken for this individual because of the similarity in names. He claimed, further, that he had met this other individual at a ball game in Los Angeles and had bought all his medical books, thus explaining the names in his books. He also wrote to Johns Hopkins Medical School stating that, owing to an unfortunate similarity in names he was being confused with Koba, and asked that school to notify the American Medical Association that he (Kuba) was not the impostor Koba. He also sent the Bureau of Investigation details of this supposed mistake in identity. When asked for further information by the Bureau of Investigation he did not answer its letter.

In connection with subsequent investigation at the University of Minnesota, Dr. Wangenstein, chief of the Department of Surgery at the University, forced Koba to sit for a photograph. Copies of this photograph were sent to California and Washington, as well as to Johns Hopkins University, and replies came back confirming the identification of Tsuneo Kuba as Tsuneyoshi Koba. Finally (thanks to the persistent activity of Dr. Kano Ikeda of St. Paul) Koba, under the name Tsuneo Kuba, was



The 1924 picture of Koba was taken when he was a freshman at Johns Hopkins University Medical School. The 1931 picture of Koba was taken when he was at the University of Minnesota. The 1935 picture of Koba was taken from the Rochester Democrat and Chronicle of June 11, which reproduced excerpts of THE JOURNAL article (Aug. 1, 1931). The 1939 picture of Matsuzaka was taken when he was a junior at Johns Hopkins University Medical School. The first two pictures appeared in the former JOURNAL article on Koba and when shown to individuals who knew the man pictured as Matsuzaka above they stated that he was the same individual pictured as Koba, according to a Rochester physician.

medical board found that he placed an order with a local lithographer for a replica of a Johns Hopkins medical diploma. The facts developed in this case were discussed by Dr. Charles B. Pinkham, Secretary of the California State Board of Medical Examiners, in an address on "Fraudulent Credentials" given before the 1930 Congress on Medical Education, Medical Licensure, and Hospitals.

Koba was next heard from in Minneapolis as Tsuneo Kuba, M.D. While in Minneapolis, he claimed that he had recently arrived from Japan to make a tour of various clinics and hospitals and to take a postgraduate course in surgery. He presented himself to the authorities of the University of Minnesota and claimed to be the son of a prominent surgeon in Tokyo (Dr. Kichiziro Kuba, who, he said, was a classmate of Dr. Dandy of Johns Hopkins) and a graduate of a medical school in Tokyo, of which he submitted evidence in the form of a diploma. He was granted the privileges of the surgical department as a voluntary fellow and was assigned to the urologic service. Dr. Guy S. Ford, dean of the Graduate School, found, however, that Koba could present no credentials, so the man was at no time registered as a graduate student.

Prior to his contacting the University of Minnesota, Koba had served for a short time one Boyd Williams, M.D., in a

arrested in Fargo, N. D., on a warrant charging him with entry into the country under false pretenses. At the time he was reported to be acting as a valet to a wealthy resident of Fargo. In order to avoid deportation he confessed that he was Tsuneyoshi Koba, who came to the United States in 1914. The Bureau of Investigation closed its article with the comment "Where and under what name and with what forged credentials will Koba next turn up?"

On March 26, 1932, under the heading "New York City Medical News," THE JOURNAL published an item stating that Lawrence Tsuneyoshi Koba, alias Tsuneo Kuba, pleaded guilty to attempted forgery in the third degree in the Court of General Sessions, New York County, Part 6, before Judge Morris Koenig, and was sentenced to the penitentiary on February 16 for an indeterminate period. Two years later (in 1934), under the heading "New York City Medical News," THE JOURNAL published an item stating that Koba had recently been discovered acting as a junior fellow in surgery at Presbyterian Hospital, Columbia University Medical Center, using the name Akira Matuzaki.

In 1935 the Rochester (N. Y.) Democrat and Chronicle called attention to the fact that Tsuneyoshi Koba was booked in Rochester police headquarters on the charge of vagrancy and

that he had presented himself at Rochester with a letter of recommendation and sought a fellowship at a Rochester hospital to continue his research work, according to the police authorities. He claimed to have been a former Davis Cup player on the Japanese tennis team. One thing that made the authorities suspicious of Koba was the fact that he was not playing tennis of a caliber one would expect of a Davis Cup player. Unable to give him a fellowship, hospital authorities permitted him to remain as a visiting student. In connection with this case a Rochester physician wrote to the American Medical Association and obtained the information which the Bureau of Investigation had on Koba and excerpts from the report were included in the newspaper article referred to above.

In October 1940 another Rochester physician inquired of the Bureau of Investigation concerning a Japanese by the name of Masao Matsuzaka and stated that he suspected Matsuzaka was the impostor written up in *THE JOURNAL* some years ago. A check of the files indicated that he presumably referred to the article on Koba, especially because Koba, when at the Presbyterian Hospital in 1934, used the name Akira Matuzaki and because he was located in Rochester in 1935. A copy of *THE JOURNAL* article was forwarded to the Rochester physician and his attention was also called to the article which appeared in the *Democrat and Chronicle* for June 11, 1935. This physician subsequently wrote and stated the following:

"I wish to say that my patient has positively identified him [Masao Matsuzaka], from the pictures in the [Koba] article which you sent me, as the same individual who has worked for him as a butler for the past four or five years. As a butler, he was most satisfactory and thoroughly honest. It is interesting that this individual was left entirely alone, over periods of three to four months at a time, in the house and at no time was anything ever missing or lost. His prowess as a tennis player was a source of interest to friends of the family and he instructed the children in the playing of tennis and, at various times during the summer months at Chatham, Mass., was continually in demand by the highest social sets, as a tennis partner and opponent on the courts of the Chatham Beach Club. In the spring of 1939 he signified his intention to stop work to enter medical school at Johns Hopkins and to this end persuaded his employer to help him financially."

According to a telegram received by this Rochester physician and signed by Alan M. Chesney, M.D., Dean, Johns Hopkins Medical School, "Masao Matsuzaka, Japanese student, was admitted to third year class September 1939 and dropped from school June 1940 for failure in surgery, obstetrics and pediatrics."

According to the physician, Matsuzaka returned to Rochester in the summer of 1940 and told his former employer that because of excellence in his work he had been chosen as a special post-graduate student in surgery, to work under Graham in St. Louis, and again requested aid. Subsequently Washington University Medical School wrote to the employer for recommendation as to his personality and qualifications, and the employer asked the physician to contact Johns Hopkins. Washington University was then made aware of his record the preceding year at Johns Hopkins. Word has since been received that he has been refused admission to Washington University Medical School.

It does not seem to be entirely out of order for the Bureau to repeat its question of 1931: "WHERE AND UNDER WHAT NAME AND WITH WHAT FORGED CREDENTIALS WILL KOBA NEXT TURN UP?" and add "And how soon?"

MISBRANDED PRODUCTS

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the United States Department of Agriculture

[EDITORIAL NOTE.—These Notices of Judgment are issued under the Food, Drug and Cosmetic Act and in cases in which they refer to drugs and devices they are designated D. D. N. J., cosmetics C. N. J., and foods F. N. J. The abstracts that follow are given in the briefest possible form: (1) the name of the product; (2) the name of the manufacturer, shipper or consigner; (3) the composition; (4) the type of nostrum; (5) the reason for the charge of misbranding, and (6) the date of issuance of the Notice of Judgment—which is considerably later

than the date of the seizure of the product and somewhat later than the conclusion of the case by the Food and Drug Administration.]

Black and White Ointment.—Plough Sales Corporation, Memphis, Tenn. Composition included about 8.05 per cent of red mercuric oxide, whereas the label falsely claimed 10 per cent of this substance was present. For itching, soreness and burning accompanying ringworm, psoriasis and eczema (of external origin).—[D. D. N. J., F. D. C. 90; May 1940.]

Booth's Camphorated Oil.—J. F. Booth, Harbor Springs, Mich. Composition: in one specimen not more than 12.6 per cent of camphor and in another not more than 9.3 per cent. Misbranded, since the Pharmacopoeia provides that camphorated oil shall contain not less than 19 per cent of this substance. Misbranded also in the representations that it was efficacious as an anodyne in rheumatic affection of the joints and that it was useful in rheumatism, swellings of the breasts or joints or in colds on the chest.—[D. D. N. J., F. D. C. 96; May 1940.]

Booth's Carbolic Salve.—J. F. Booth, Harbor Springs, Mich. Composition included 2.9 per cent of carbolic acid. Product held to be adulterated because labeled to contain 5 per cent of this substance. Misbranded because falsely represented to be useful for ulcers, boils, hemorrhoids and some other conditions.—[D. D. N. J., F. D. C. 96; May 1940.]

Booth's La Grippe & Cold Tablets.—J. F. Booth, Harbor Springs, Mich. Composition: acetanilid (1 grain per tablet), a small amount of salol, a quinine compound and a bromide, with red pepper, chalk and starch. Falsely represented as the best remedy for la grippe and for stimulating the liver and secretions to perfect action.—[D. D. N. J., F. D. C. 96; May 1940.]

Booth's Liniment.—J. F. Booth, Harbor Springs, Mich. Composition: essentially volatile oils (including peppermint, mustard and wintergreen), alcohol (36.1 per cent by volume) and chloroform (10.8 per cent). Falsely represented as a remedy for rheumatism, gout, weak joints, sore lungs and some other things.—[D. D. N. J., F. D. C. 96; May 1940.]

Booth's Liver Pills.—J. F. Booth, Harbor Springs, Mich. Composition: plant drugs including red pepper, nux vomica and a laxative drug. Falsely represented as a remedy for headache, dizziness, torpid liver, dyspepsia and some other disorders.—[D. D. N. J., F. D. C. 96; May 1940.]

Booth's Mentholated Cough Drops.—J. F. Booth, Harbor Springs, Mich. Composition: sugar lozenges flavored with menthol. Falsely represented as giving immediate relief in coughs, colds, hoarseness and sore throat.—[D. D. N. J., F. D. C. 96; May 1940.]

Cotec.—Cotec Co., Lynn, Mass. Composition: essentially fat and excrement. Falsely represented as a remedy for hemorrhoids, sores, ulcers, prolapsus of the bowels, kidney and bladder trouble and some other things.—[D. D. N. J., F. D. C. 95; May 1940.]

Dormalglin.—Lawson M. Luth, Geneva, N. Y. Composition: aminopyrine and a barbituric derivative. Falsely represented as a useful, harmless pain killer, whereas it contained dangerous drugs.—[D. D. N. J., F. D. C. 97; May 1940.]

Ma-El-Ra-Tone Herb Compound.—General Products Laboratories, Columbus, Ohio. Composition: a material proportion of epsom salt, a mineral substance, whereas the label reported it to consist entirely of herb and other vegetable substances.—[D. D. N. J., F. D. C. 93; May 1940.]

Messina Effervescent Granular.—Drew Corporation, Brooklyn. Composition: According to the label, it was prepared with sugar, baking soda, tartaric acid, citric acid and oil of lemon. The undeclared presence of an additional substance, borax, was found to constitute misbranding.—[D. D. N. J., F. D. C. 92; May 1940.]

Myasthene Tablets.—Medicinal Specialties Co., New York. Composition: 7.2 grains of aminoacetic acid (glycocoll) per tablet. Falsely represented as efficacious for "tired feeling," loss of appetite and certain types of nervousness.—[D. D. N. J., F. D. C. 100; May 1940.]

Old Man Frantz Mountain Tonic.—Old Man Frantz, Pittsburgh. Composition: in each fluid ounce 178 U. S. P. units of vitamin A, 400 international units of vitamin B₁, 334 international units of vitamin C, and not more than 251 U. S. P. units of vitamin D. Falsely represented to contain a significant amount of vitamin A per prescribed dose; to increase vigor and remedy such conditions as nervousness, poor appetite, dry skin, diarrhea, sterility, glandular atrophy, pellagra, dermatitis, loss of hair, and many other things.—[D. D. N. J., F. D. C. 85; May 1940.]

Saurinol.—Saurinol Distributors Corporation (no address given). Composition: "consisted essentially of medium boiling petroleum oil." Falsely represented as a relief from sinus trouble, hay fever, exposed cancer, varicose veins, pyorrhea, trench mouth, laceration, ulcers, and skin diseases.—[D. D. N. J., F. D. C. 98; May 1940.]

Seeley's Spook Oil Linament.—G. A. Seeley, Louisville, Colo. Composition: turpentine (50 per cent) wintergreen (2 per cent) and a fatty oil. Falsely represented as useful for treating hemorrhoids, toothache, colds, sunburn, earache, sore joints, rheumatic pains, dandruff and some other things.—[D. D. N. J., F. D. C. 101; May 1940.]

Yucca-Balm.—Geo. Bell Co. (Yucca Balm Co.), Ogden, Utah. Composition: essentially soft soap and cresol (0.30 per cent). Falsely represented as a relief of sore feet, dandruff, pains and swellings.—[D. D. N. J., F. D. C. 102; May 1940.]

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

PLANO LENS IN SAFETY SPECTACLES

To the Editor:—With regard to safety spectacles used in industries, with a six-curve plano lens is it true that it will produce a prismatic effect, any magnification at reading distance and surface reflections regardless of the frame and its size? I have an example of three patients who have a vision of 20/20 or better in each eye who complain of a pulling sensation while wearing the plano goggles. None have any disease.

M.D., New York.

ANSWER:—This question is really a series of several questions, answers to which will be taken in order:

1. True plano lenses cannot produce prismatic effects. A "plano" lens ground on a six base curve has usually a slight myopic effect. Several manufacturers, when questioned, agreed that the presence of an additional slightly smaller image sometimes seen through such lenses is due to the light bouncing back and forth between the two surfaces of the lenses and finally emerging so as to produce the apparent effect of a prism. The secondary images seen at the side are always much smaller and much diminished in intensity. They may be somewhat further diminished by the use of a thin layer of soap or by the use of a tint in the glass. In plus lenses (lenses with a convex effect) one practically never notices this phenomenon.

2. True plano lenses produce no magnification at the reading distance or at any other distance.

3. Surface reflections are not due to the size of the lens or to the frame in which it rests.

4. The pulling sensation complained about by patients wearing true plano goggles may be due to one of two causes: Either the goggles are not perfectly ground, that is they contain flaws such as waves or pits or slight irregularities, or there are actual prisms in the goggles. If the goggles are not perfectly ground, flaws or a slight minus effect make them exceedingly annoying. This is often the case with cheap goggles. When there are prisms in the goggles, the lenses are not plano but have an actual prism. Usually this prism has a base in the vertical position, as a small prism base in or out almost never causes any discomfort. If it does, it is usually considered to be entirely on a psychologic basis.

Large companies who fit many goggles find that men between 18 and 30 are apt to complain of a pulling sensation. In these plants it is customary to have the correction ground into the goggles. Even then occasionally there are complaints and this is particularly true if the goggles are incorrectly ground or poorly surfaced.

ALLERGIC RHINITIS FROM READING NEWSPAPER

To the Editor:—A patient with allergic rhinitis gets sneezing spells from reading a freshly printed newspaper or a magazine with heavy print. The patient is able to read the newspaper without trouble a day after it has been opened and exposed to the air. Which part of the print could be the offending substance and what tests would you recommend?

M.D., Wisconsin.

ANSWER:—The printing ink may be the offending cause of the rhinitis, although customarily dermatitis rather than rhinitis results from such exposure. Colored and rotogravure inks are more prone than black inks to induce manifestations, but in this instance the implication in the query is that the exposure is to black ink, since reference is made to newspapers. The composition of black ink varies appreciably, but typical ink consists of carbon black (at times coal tar) with some resin such as shellac in an oil such as linseed with a quick drier such as turpentine. It is suggested for test purposes that a small quantity of black ink be procured from some pressroom and be smeared on a glass surface. This should be located in the patient's room in order to establish any response. If the characteristic rhinitis promptly appears, this may be sufficient for diagnostic purposes, but otherwise similar tests may be carried out with respective ingredients, such as shellac, turpentine or lamp black. If no response follows exposure to the ink, a few sheets of blank newsprint paper similarly should be acquired from the pressroom, which should be handled by the patient as though it were a newspaper. In pressrooms, printers occasionally develop respiratory disorders from paper pulp dust, which, however, obviously is more prevalent in a pressroom than from handling a single newspaper. Should these tests fail, it should

be recognized that printing presses are being cleaned continually with such solvents as naphtha, benzene, toluene, soda ash and trisodium phosphate. It is unlikely that these cleaning agents would carry over to the printed page, but the possibility exists. If all such tests disclose no cause for the rhinitis, it may be helpful to carry out tests with a great variety of ingredients of colored inks, which vary from color to color. A list of the commoner constituents of colored ink may be found in Schwartz and Tulipan's "Occupational Diseases of the Skin." Among others, there are mentioned paranitranilin, Persian berries, Brazilian wood, redwood and picric acid.

Some magazines but, as far as known, no newspapers, are printed by the offset method. In this process the printed sheet may be sprayed with a suspension of acacia or starch in alcohol. Sometimes printers develop respiratory disorders, chiefly asthma, following sensitization to these vegetable dusts. Conceivably, enough of such drying agents might adhere to the page to harm the patient.

LIBIDO IN ELDERLY WOMAN

To the Editor:—Could you offer some suggestion as to treatment and possible etiology of a persistent intense libido in a widow aged 72? Examination does not show any genital irritation which might be an exciting factor. Symptoms started following administration of "Cortalex" given for daily fainting spells which were preceded by a feeling of pronounced weakness. Treatment consisted of one tablet of Cortalex four times daily for three weeks. Results were good. About one month later the patient started to complain of a tingling sensation and itching of the breast and later the increased libido. The breasts seemed to enlarge temporarily; also the patient complained of an enlargement of the abdomen, first noticed when her clothes became tight. This has since decreased by 2 inches actual measurement. The breasts have since returned to normal size, although at times the tingling returns to such a degree that the patient slaps her breasts for relief. The increased libido either follows or accompanies this occurrence. There is a history of salpingectomy following an old gonorrheal infection; also a second operation for adhesions. Pelvic examination shows normal hair distribution, normal external genitalia and normal vaginal mucosa for a person of this age; the vaginal introitus and canal are tight. The uterus is apparently atrophied but smooth in outline and in normal position. There is no cystocele or rectocele and no sign of pelvic tumor or any pronounced abdominal tenderness. Spinal fluid pressure is normal. Blood and spinal fluid Wassermann tests are negative. Hemoglobin and blood counts are normal. The blood pressure is 112 systolic, 70 diastolic. Otherwise the physical examination is essentially negative. The patient is nervous; she has had two illnesses which she described as nervous breakdown and has little to do to occupy her time. Her appetite is poor. Bromides and barbitals together with the use of a soothing vaginal suppository are all ineffective. Testosterone propionate is the only thing that seems to give some relief. Is there any contraindication? Do you have any other suggestions?

M.D., Washington.

ANSWER:—It is highly doubtful whether the increase in libido following the administration of adrenal cortex extract can be explained on the basis of a stimulation in growth of the reproductive organs. Adrenal cortex steroids have a slight proliferating effect on the sex organs but it is improbable that the amount of activity in the dosage used by this patient would have any significant effect in this direction. It is difficult to explain the result obtained. One possibility is that the extract produced water retention in the various tissues of the body, including the vagina and clitoris. This water retention may not be visible grossly. Nevertheless it could cause an irritation which would result in the increased libido. Ammonium chloride 0.5 Gm. (7½ grains) three times a day might be administered, as recommended by Greenhill and Freed for the relief of premenstrual edema and tension (*Endocrinology* 26:529 [March] 1940) in the treatment of this patient. If this therapy is effective the theoretical consideration that the libido was due to the increase in extracellular fluid about the vulva would appear justified.

SUBCUTANEOUS ATROPHY FROM INSULIN

To the Editor:—Certain individuals are susceptible to subcutaneous atrophy from the use of insulin. I am anxious to find out what this X product is that causes this subcutaneous atrophy. I believe it could be used in certain individuals, especially from a cosmetic standpoint, and I would appreciate it if you would give me the names of some laboratories which you think would be interested in research along this line.

William VanderVoort, M.D., Battle Creek, Mich.

ANSWER:—This inquiry may be best answered by quoting from the recently published book by Wilder, *Clinical Diabetes Mellitus and Hyperinsulinism*. Under the heading "Insulin Fat Atrophy" on page 95 the following statement appears: "By insistence on varying the site of injection, the occurrence of these disfiguring lesions usually can be avoided. However, they have been encountered, even with well trained patients. The cause is unknown. Some type of local sensitivity of the tissues of an allergic type may be responsible. Almost all these patients have been women. The treatment of insulin atrophy is principally a matter of prevention by the exercise of scrupulous care in the

technic of the hypodermic infection. There is some advantage in using only highly concentrated insulin, such as U-80. If the affected regions are avoided in subsequent treatment, the depressions after several months usually fill in spontaneously; occasionally they persist for years."

The suggestion that an X product in insulin is responsible for this subcutaneous atrophy is not a likely one. The condition occurs in so few individuals that the abnormality is probably in the patient rather than in the product. Even if there were such an X product it would be most unwise to use it as a cosmetic agent for the reason, as Joslin has emphasized, that occasionally the atrophic regions are remote by several centimeters from the site of injection.

LEUKOPENIA AND RELATIVE LYMPHOCYTOSIS

To the Editor:—A girl aged 5 years, weighing 42 pounds (19 Kg.), had severe scarlet fever Feb. 1, 1940. The white blood count was 42,000, polymorphonuclears from 78 to 80 per cent, eosinophils from 10 to 12 per cent. On the fourth day of illness the child was put on sulfanilamide 45 grains (3 Gm.) daily for three days, then 30 grains (2 Gm.) daily for three days, then 20 grains (1.3 Gm.) daily for two days and 15 grains (1 Gm.) for one day. White blood counts were done daily during the administration of sulfanilamide. At the end of the treatment with sulfanilamide the white blood count was 22,000, polymorphonuclears from 79 to 80 per cent. The blood picture was not unusual and the patient was doing well. February 21 the temperature suddenly went to 104. The patient was severely nauseated and vomited considerably for one day. She had a moderate cervical adenitis. The white blood count was 36,000. She was again put on sulfanilamide 30 grains (2 Gm.) for three days. White blood counts and differentials were done daily. At the end of four days the patient was again doing well and the white blood count was 21,000. There was no reduction in the polymorphonuclears. The patient had no fever; was up and about and felt well. June 13 and June 23 she was given typhoid vaccine. June 28, 29 and 30 she had a fever of 102. She did not feel particularly bad and had no physical signs. July 1 the patient's temperature was normal and she felt well. On this date the red blood count was 4,100,000, hemoglobin 70 per cent, white blood count 6,100, polymorphonuclears 22.5 per cent, lymphocytes 64 per cent, monocytes 7 per cent, eosinophils 6.5 per cent, basophils none. July 3 the white blood count was 8,450, polymorphonuclears 25 per cent, lymphocytes 55 per cent, monocytes 11.5 per cent, eosinophils 8.5 per cent. Is it possible that the leukopenia, neutropenia and increase in the number of lymphocytes could be caused by the typhoid vaccine? It hardly seems possible that the neutropenia could be caused from the sulfanilamide; however, no count was done one month after the sulfanilamide was discontinued. The patient is feeling well and has no sore throat. She is on a general supportive treatment. What is the significance of the reduced neutrophils?

John E. Haynes, M.D., Dawson Springs, Ky.

ANSWER.—Several explanations of the leukopenia and relative lymphocytosis in this patient are possible:

1. She may have had some systemic infection such as influenza, which is characterized by such a blood picture. Certainly her temperature beginning five days after a typhoid vaccine injection is an unusual reaction, and the vaccine cannot be assumed to be the cause of this.
2. Following a severe infection, a lymphocytosis is frequently seen and may last for several months.
3. Lymphocytosis is usual in children. Certainly it is unlikely that the sulfanilamide played a part. The typhoid vaccine may have been partially responsible.

TUBERCULOUS MENINGITIS

To the Editor:—Are there authentic records of death from tuberculous meningitis with an absence of clinical symptoms or records of tuberculous meningitis which show profuse hemorrhage into the spinal canal together with definitely formed blood clots?

M.D., New Jersey.

ANSWER.—If the meaning of the inquiry is that patients die of meningitis with no symptoms at all, the answer is no; that is, there is no record of a fatal symptomless tuberculous meningitis. There are rare reports, however, on a healing meningitis, but not without symptoms (Hektoen, Ludvig: *The Fate of Giant Cells in Healing Tuberculous Tissue, Tr. Chicago Path. Soc.* 2:283, 1897). If it is meant that there are no other symptoms than those originating within the cranium, then the answer is yes. Many cases develop from old tuberculomas beneath the ependyma long after the other body foci are healed (Rich, A. R., and McCordock, H. A.: *The Pathogenesis of Tuberculous Meningitis, Bull. Johns Hopkins Hosp.* 52:5 [Jan.] 1933).

It is also possible for tuberculous meningitis to be found at necropsy in the absence of clinical symptoms. This rare occurrence represents an early stage incidental to an advanced pulmonary tuberculosis wherein symptoms of the latter were so severe that they overshadowed those of the meningitis. As most of the symptoms of meningitis are due to intracranial pressure, it is thus possible for the early lesions to exist without significant symptoms.

No reports of profuse hemorrhage into the spinal canal in tuberculous meningitis are available and they have not been

seen in extensive experience in large tuberculosis sanatoriums with or without blood clots. It is possible, however, that they may result during a meningitis or from intracranial trauma, convulsions, falling against or out of bed, hemorrhagic diathesis or cerebral hemorrhage.

NEUROLOGIC EFFECTS OF PELLAGRA

To the Editor:—What is the cause of the combined degeneration of the spinal cord in pellagra? What is the cause of the macrocytic anemia which occasionally appears in pellagra? Of the cerebral symptoms in pellagra, which are caused by nicotinic acid deficiency and which are caused by thiamine hydrochloride deficiency? Is "central neuritis" generally accepted terminology?

M.D., California.

ANSWER.—The cause of the combined degeneration of the spinal cord in pellagra is not known. Sufficient time has not elapsed since the discovery of the crystalline vitamins to ascertain whether any one of the known factors in the vitamin B complex is responsible or not. The macrocytic anemia which occasionally appears in pellagra may arise from a deficiency of intrinsic factor such as in Addisonian conditions of anemia or may be due to a lack of the factor described by Wills. Of the cerebral symptoms in pellagra it is not yet known which ones are caused by lack of nicotinic acid and which by lack of thiamine hydrochloride, but there seems to be a degree of non-specificity in that similar conditions may be relieved by either one of these compounds. The term "central neuritis" is well known to workers in the fields of psychiatry and neurology.

References:

- Wills, Lucy; Clutterbuck, P. W., and Evans, Barbara D. F.: A New Factor in the Production and Cure of Macrocytic Anemias and Its Relation to Other Hemopoietic Principles Curative in Pernicious Anemia, *Biochem. J.* 31:2136 (Nov.) 1937.
Frostig, J. P., and Spies, T. D.: The Initial Nervous Syndrome of Pellagra and Associated Deficiency Diseases, *Am. J. M. Sc.* 199:268 (Feb.) 1940.

CONGENITAL SYPHILIS IN ADULT WOMAN

To the Editor:—A 28 year old woman at present is in good health and has no complaint with the exception that glasses must be worn all the time. Fourteen years ago on March 17, 1926, a 4 plus Wassermann reaction was discovered during the investigation of a severe iritis and some arthritis. Her mother's blood also was found to be 4 plus. Treatment was instituted at once and consisted in the injection of eighteen doses of neocarsphenamine of 0.45 Gm. each during the course of the next seven months. There is no certain knowledge of the serologic reaction at this time although the patient is sure it was negative. Two years later, in March 1928, the Wassermann reaction of the blood was recorded as 3 plus. At this time the patient was started on mercuric iodide and mercury rubs. The number of applications is not known but the patient states that treatment continued for many weeks and that at the end the blood reaction was negative. The only residual effect was a disturbance in vision for which glasses have had to be worn since. The iritis cleared rapidly under the neocarsphenamine. In the past few years the patient has had several Kohn and Wassermann tests at reliable laboratories and all have been negative. Two spinal fluid Wassermann tests have been done in the past two years and were negative. Complete physical examinations have been done in the past three or four years and the only defect noted is in the eyes. The pupils are slightly irregular and are small. They do not react to light or in accommodation. (Am I correct in the belief that this is not an Argyll Robertson pupil since it does not react in accommodation?) The eyegrounds appear to be quite normal. The patellar and other reflexes are normal. Blood counts and urine examinations give normal results. The remainder of the physical examination is normal. X-ray examinations of the chest and heart about a year ago gave normal results. What should be the program for this patient from now on?

Ralph E. White, M.D., Santa Ana, Calif.

ANSWER.—The question of subsequent treatment of a 28 year old woman with congenital syphilis in whom the blood and spinal fluid tests are negative and who presents no active symptoms of the disease depends in a great measure on whether or not she is married and is likely to become pregnant or is desirous of becoming pregnant.

If unmarried, there are two possible courses to pursue: one, to give fifteen injections of a bismuth compound twice a year for three years and then observe regularly thereafter; the second course and the one that seems warranted for this young woman is to give no treatment but to continue only with observation, having her report every six months for a recheck. The status of the blood serologic tests whether negative or positive are not of significance under this program.

On the other hand, if she is married or plans to marry, and if she becomes pregnant intensive treatment should be given. The treatment is given not only to assure her of a nonsyphilitic child (for which the prospects are excellent) but, of equal importance, to prevent a recurrence of the trouble in her eyes, whether it is iritis or interstitial keratitis. The assumption that she does not have Argyll Robertson pupils seems valid, as the absence of pupillary reactions might well be the result of the iritis she has had.

RELAPSE OF DIABETES

To the Editor:—A youth aged 18 came under my care in February 1940 with severe diabetes mellitus. His original fasting blood sugar was 362 mg. during institutional treatment. He quickly responded to ordinary therapy and was discharged on a liberal diet varying from 2,300 to 2,800 calories and 30 units of protamine insulin daily, under which his blood sugar was normal and there was no glycosuria. The patient is an athlete and his cooperation in all respects has been excellent owing to his desire to reattain physical efficiency. Over a period of several months his course was entirely uneventful until he became employed in a pea canning factory. He was here engaged in making syrup, the process consisting of the addition of refined granulated sugar and salt to boiling water. He worked in a steam enclosed room. Forty-eight hours after undertaking this work his urinary sugar sharply increased and all symptoms of severe diabetes mellitus made their appearance. I am quite positive that there was no intentional intake of sugar and that there could have been no source of sugar consumption other than by the inhalation of a sugar-saturated atmosphere. Careful cleansing of the hands had been done previous to eating. Would it be possible by the means of such sugar-saturated steam inhalation to bring about this marked glycosuria?

M.D., Illinois.

ANSWER:—A diabetic patient who changes his mode of life is apt to suffer a temporary upset of the control of his diabetes. The amount of exercise, hours for meals and actual content of meals may vary and it takes time to become adjusted.

Sugar is not volatile and would not be present in the steam from the boiling liquid. One could not explain on that basis the flare-up in the diabetic condition. Theoretically the patient should not have an increase in glycosuria simply because of working in the atmosphere described.

Still other factors enter into the problem. Any diabetic person energetically treated at the onset of his diabetes is apt to do surprisingly well. After a few months, adjustments take place and the results are not quite as clearcut, owing to the natural course of the disease, to gradual laxity in treatment by the patient, or to the fact that the tolerance for carbohydrate has been overestimated and the prescribed diet increased above the optimum for ease of control.

PHOTOPHOBIA

To the Editor:—For more than five years I have suffered from photophobia. This appeared to have started while using a microscope in medical school about 1928. Glasses for hyperopia were prescribed. Little or no relief was obtained. At present I am wearing a +1.50 in both eyes, no tinting, with no relief (latent hyperopia—vision without cycloplegic is 20/15). The condition is much worse after a period of reading or picture shows; that is, after use of the eyes. On waking there is extreme sensitivity to light for about a half hour, after which I am able to open the eyes fairly well. Glasses have been prescribed by several competent ophthalmologists, usually with disagreement as to the amount of correction, type of frames, tinting and the like. My general health is good. There is strong possibility of a chronic (if there is such) appendicitis and possibly a focus of infection in the prostate. I must study at least an hour a day.

M.D., Georgia.

ANSWER:—Photophobia in a large percentage of cases is due to a chronic inflammatory process of the conjunctiva, with or without minute infiltrations of the superficial cornea. These are apt to be overlooked in the course of a routine refraction; in fact in many cases such forms of keratitis can be detected only with a slit lamp. Again, in certain instances photophobia may result from the train of conditions attendant on an imbalance of the ocular muscles. Proper attention to the muscle balance and fusion will be followed by permanent relief. In only a few cases is photophobia the result of a true retinal sensitivity. This may be due in some instances to glandular dysfunction, to vitamin deficiency or occasionally to a chronic focal infection. Consequently the search for the cause of photophobia should be directed to the conjunctiva, the cornea, the muscle function and, finally, if all of these are found to be normal, to a possible source of retinal irritation.

TESTING FOR ARCH STRENGTH OF FEET

To the Editor:—In connection with the examination of army applicants it is often difficult to determine the strength of the arches in cases of congenital or acquired flatfoot. What tests are employed by orthopedists to determine the strength or weakness of such feet?

M.D., Washington.

ANSWER:—There has been no satisfactory test devised to determine the strength or weakness of feet of army applicants. The only satisfactory test is that of the functional capacity. For the present this is best judged from the history, that is, how far the individual can walk. The appearance of the foot is to some degree an indication of the capacity of the foot. A weak foot of long existence will show pes valgoplanus. On the other hand, a weak foot that has had no great demand made on it could show a relatively good appearance, particularly if it has been supported. The pes valgoplanus in every case is a less efficient foot than one that retains the normal position with weight bearing. An indication of the amount of decompensation of the foot

can be obtained by measuring the foot before and after weight bearing, both as to length and as to width. Another method of measurement is to take lateral roentgenograms of the foot with the foot on a flat surface, without weight bearing and then with weight bearing, and determine the height of the arch in each case.

Unfortunately, these methods have not been developed to an extent to which they can be used as a direct indication of the capacity of the foot. At the present time there is no objective method of determining the actual strength of a flatfoot except by its ability to carry out the work required.

PTERYGIUM

To the Editor:—One of my patients states that he had bilateral pterygium cured within two weeks by using topical applications prescribed by a specialist and that he did not undergo any operative procedure whatever. Are there any drugs which may be used successfully in the treatment of pterygia? If so what are they and are they safe to use—or, rather, what are their limitations?

Stanley H. Macht, M.D., Crewe, Va.

ANSWER:—Cases of true pterygium are not cured by any topical application so far as known. They have been treated by electrocoagulation, which obliterates the vessels and causes the tissue to slough off, but this method has nothing to recommend it over a properly performed surgical procedure. It is contended that the use of some strong coagulant, such as trichloroacetic acid, might also obliterate the vessels, but it is not considered as safe as a proper surgical procedure.

REPORTING RESULTS OF TESTS FOR SYPHILIS

To the Editor:—The Committee on the Evaluation of Serodiagnostic Tests for Syphilis of the United States Public Health Service has advocated reporting the results of all serum tests for syphilis as "positive," "doubtful" and "negative." Under this plan all definitely positive reactions hitherto recorded as strongly or moderately positive are reported merely as "positive," while weaker reactions are reported as "doubtful." I would appreciate greatly an interpretation of "strongly" and "weaker" reactions as compared with the usual 4 plus, 3 plus, 2 plus, 1 plus, plus-minus. In other words, how should a 3 plus reaction, how a 2 plus reaction be reported according to the plan of the committee?

C. Alexander Hellwig, M.D., Wichita, Kan.

ANSWER:—Serologists have not adopted a single plan for reporting the results of tests for syphilis. Kolmer, for example, reports very strongly positive, strongly positive, moderately positive, weakly positive, doubtfully positive and negative. Kahn reports positive (+++), positive (+++), positive (++), doubtful (+), doubtful (±) and negative. Other serologists, as for example in the New York State Health Department Laboratories, report quantitative serologic titers. However, those who report positive, doubtful and negative generally include 4 plus, 3 plus and 2 plus reactions under positive, 1 plus and plus-minus reactions under doubtful.

ISOTHIOCYANATES IN COLD CREAM

To the Editor:—Would the incorporation of an isothiocyanate in a cold cream base be injurious to the skin? Any information and references would be appreciated.

Jacob Weinless, M.D., Bronx, N. Y.

ANSWER:—It has been shown that the rubefacient action of dissolved allylisothiocyanate is roughly inverse to its solubility in a given solvent. Thus, a 1 per cent solution of allylisothiocyanate in olive oil causes little or no irritation; in dilute alcohol marked irritation; in an emulsion in mucilage, still more irritation. It therefore might be practical to incorporate esters of isothiocyanic acid with cold creams in order to obtain controlled rubefacient action such as would be desirable in certain chronic cutaneous conditions in which increased circulation in the blood vessels of the skin is desired. The esters (allylisothiocyanate) are commonly called the volatile oil of mustard and are strong irritants and vesicants. The use of isothiocyanates in cold creams is not to be recommended as a general practice.

ASTHMA IN PREGNANCY

To the Editor:—A primipara aged 35 is a sufferer from asthma. Her blood pressure is 120 systolic, 70 diastolic. What effect if any will epinephrine have on the uterus and what effect, if any, will solution of posterior pituitary have on the asthma? What anesthetic would be suitable for this case, for home delivery?

M.D., Kentucky.

ANSWER:—Solution of epinephrine in therapeutic doses is not contraindicated during pregnancy because of any possible abortion. The use of solution of posterior pituitary in asthma is not considered of benefit by most workers in the field. The choice of an anesthetic is not affected by asthma in the absence of respiratory infection. General ether anesthesia is recommended by some allergists for temporary relief of severe asthma.

Western Reserve University School of Medicine (1917), (1935), (1937) Ohio	
University of Oklahoma School of Medicine (1930), (1936, 2), (1938, 2) Oklahoma, (1938) Maryland	
Hahnemann Medical College and Hospital of Philadelphia.....(1932) New Jersey, Pennsylvania	
Jefferson Medical College of Philadelphia.....(1894) Nebraska, (1921) Pennsylvania, (1932) Ohio	
Temple University School of Medicine.....(1938) Penna.	
University of Pennsylvania School of Medicine.....(1919) Penna.	
Meharry Medical College.....(1936), (1939) Tennessee	
University of Tennessee College of Medicine..(1936), (1937), (1938), (1939, 2) Tennessee	
Vanderbilt University School of Medicine....(1929), (1937) Tennessee	
Baylor University College of Medicine.....(1937) Washington	
Medical College of Virginia.....(1906) Arizona, (1931) Virginia, (1932) West Virginia	
University of Virginia Department of Medicine.....(1931) Virginia	
McGill University Faculty of Medicine.....(1902) New York	
Rheinische Friedrich-Wilhelms-Universität Medizinische Fakultät, Bonn.....(1934) New Jersey	
Universität Köln Medizinische Fakultät.....(1934) New York	
University of Edinburgh Faculty of Medicine.....(1932) New York	
Universität Basel Medizinische Fakultät.....(1935) New York	
Osteopath †.....California	

School	LICENSED BY ENDORSEMENT	Year Endorsement Grad. of
University of Oregon Medical School.....	(1933)	Alaska
Baylor University College of Medicine.....	(1939)	U. S. Navy

* This applicant has received the M.B. degree and will receive the M.D. degree on completion of internship.
† Licensed to practice medicine and surgery.

Book Notices

Arthritis and Allied Conditions. By Bernard I. Comroe, A.B., M.D., F.A.C.P., Instructor in Medicine, University of Pennsylvania, Philadelphia. Cloth. Price, \$8.50. Pp. 752, with 200 illustrations. Philadelphia: Lea & Febiger, 1940.

Comroe's book is the most comprehensive English treatise on arthritis and allied conditions that has appeared in years. It is well printed and profusely illustrated.

The practitioner will appreciate the author's avoidance of the error of many previous writers, namely limiting the text to chronic arthritis. The arthritides of known and unknown etiology as well as many allied medical and orthopedic conditions are discussed. The diseases commonly mistaken for arthritis are listed and a synopsis of the more important clinical features of each one is presented.

The practitioner will find it a most usable and practical book containing the necessary information relative to the etiology, clinical course, diagnosis and prognosis of the various diseases of joints and many skeletal afflictions. The treatment of most of these conditions is given in detail. The more pertinent features of each disease are emphasized by presenting them in synopses which are set off by heavy black lines, thus making them readily available for the busy practitioner.

The objects of the book as outlined in the introduction have not been completely fulfilled. For his opinions the author has relied on the current literature, much of which has not been critically digested and summarized, rather than on clinical and laboratory experience. Had the book been better edited in this respect the reader would be saved considerable time and would be able to ascertain with more certainty Comroe's views on many controversial matters.

Two hundred and eighty-six pages pertain to rheumatoid arthritis; however, the extremely important subjects of degenerative joint disease, rheumatic fever and gout are dismissed with seventeen, twenty-four and twenty-eight pages respectively. Of these 286 pages only four are devoted to etiology, three to pathology and twenty to the clinical description of the disease; yet 125 pages are concerned with many therapeutic measures of questionable value. Adequate space is given, however, to the important subjects of physical therapy and orthopedic treatment. Many will question the necessity of devoting more than 200 pages to numerous allied orthopedic diseases or, if they approve, will wish that these subjects had been written by a competent, authoritative orthopedic surgeon and not an internist. The reviewer believes that much of this space should have been assigned to the other arthritides and to the many diagnostic problems which confront the student of diseases of joints. The subject of spondylitis, for example, is inadequately presented.

The book begins with a much abbreviated classification of joint diseases. The outline employed by the author in studying

each new patient is presented and the important points to be looked for in the history and physical examination are stressed. The section on radiology in the diagnosis of the arthritides would have been strengthened by a more detailed description of the changes occurring at various stages. In addition is included a list of examinations frequently requested. Unfortunately, the diagnostic significance of these points and the indications for such tests are not given. Nor does he mention that many of the tests are expensive and that the information derived is of questionable merit.

The value of the sedimentation rate is discussed. Surprisingly, the author believes that "the results may be read directly without correction factors"! Little is said about the more accurate method devised by Rourke and Ernste.

Much valuable information pertaining to the physiology of the articular structures is not included and the discussion of the origin and nature of normal synovial fluid is not complete. Many will disagree with the statement "There are no pathognomonic features of the chemical composition of synovial fluid in the various joint diseases." The cytologic and chemical characteristics of joint effusions when interpreted along with the clinical facts are often of diagnostic value.

The section on pathology of rheumatoid arthritis is unnecessarily short and incomplete. That rheumatoid arthritis nodules occur in other organs, including the eye (scleromalacia perforans), is not mentioned, although many of the visceral changes of this systemic disease are referred to.

From the section on etiology it is readily apparent that the author is an adherent of the infectious theory of the origin of rheumatoid arthritis. Before presenting any factual data he states that "an impartial evaluation of the evidence presented to date suggests that rheumatoid arthritis is probably some form of infectious disease." He fails to state that many of the clinical features which suggest that rheumatoid arthritis is an infectious disease are exhibited by gouty arthritis, a metabolic disease. The other etiologic theories of rheumatoid arthritis are not fully evaluated.

Despite the statement "Recently, a carefully conducted follow-up study has shown no permanent improvement in joint phenomena in a large series of patients with rheumatoid arthritis following careful and determined removal of all infected foci" the author burdens the reader with a twenty-five page dissertation on foci of infection in rheumatoid arthritis. The same section contains the statement that "there is a relationship between good gut function and arthritis but one cannot tell which is the cart and which the horse," yet in the following sentence he says "It is important to carefully check all of the factors in the patient's diet and to see that his colon functions well, but we do not know with any certainty what relation such hygienic measures bear to joint conditions." Such confusing statements are not helpful to the physician who seeks authoritative help. The book contains too many of them. A more critical evaluation of the subject matter contained in this section judged in the light of the author's personal experience would have strengthened the book greatly. As it stands, it is too controversial and indefinite to be helpful.

His clinical description of rheumatoid arthritis has obvious deficiencies and does not begin to compare with the detailed, scholarly dissertations of some of the older writers. Little is said concerning the many variations in onset and course of the disease nor are the diagnostic difficulties adequately discussed. He fails to stress that the differentiation of rheumatic fever from rheumatoid arthritis is often impossible without the passing of considerable time.

The sections dealing with the treatment of rheumatoid arthritis are complete. The subjects of physical therapy and orthopedic treatment are well covered and will be helpful. The chapter on diet is too detailed and unnecessarily long, considering that the author believes, as do many others, that the dietary of the patient with rheumatoid arthritis should be high in vitamins and calories (unless the patient is overweight) and adequate in iron, calcium and phosphorus. Although vitamin deficiencies are not specific for rheumatoid arthritis and not causally related, the author burdens the reader with fifteen pages on vitamins. It is most unfortunate that so many pages are devoted to such questionable therapeutic measures as sulfur, bee venom and

chaulmoogra oil, which are judged unacceptable by many authorities, including the Council on Pharmacy and Chemistry of the American Medical Association. There exists no proof that any type of infectious disease can be cured by vaccines, yet Comroe advocates their use in rheumatoid arthritis, a disease of unknown etiology. He further confuses the issue by sanctioning their administration in degenerative joint disease, a noninfectious disease. Here again the book would have been strengthened had this questionable form of therapy been presented in a more decisive manner. Although endocrine disturbances have never been demonstrated to be of etiologic significance in rheumatoid arthritis, many pages are devoted to the subject. Despite the fact that most authorities have not observed beneficial results with roentgen therapy, Comroe unequivocally sanctions its use in the treatment of various forms of arthritis. In the case of gonococcal arthritis he evidently considers it as efficacious as fever therapy and the sulfonamide compounds! Again he fails to state what his personal experience with this form of therapy has been. Until it has been demonstrated that such measures are beneficial and without deleterious effect on articular cartilage, they should not be used indiscriminately. It is also difficult to ascertain what results the author has observed in rheumatoid arthritis patients treated with gold salts.

The subject of intermittent hydrarthrosis is not fully presented. The author fails to point out that careful follow-up studies will reveal that the majority of the cases are atypical forms of rheumatoid arthritis.

The information pertaining to spas will prove helpful to the practitioner desiring it. The section on case summaries contributes little to the book. If additional case reports, presented in more detail, had been included in the respective chapters, they would have served a useful purpose.

As mentioned before, the chief criticism of the book is that it is assembled from the literature and not written from the author's experience. In consequence Comroe's personal opinion concerning many controversial matters is never given. There is nothing constructive about the book and no evidence that the author has done any considerable amount of original work. All but six of the illustrations are borrowed from the literature. The book would have been greatly improved, materially shortened and more readable had the subject matter (chiefly a digest of the current literature) been critically and concisely reviewed. Many of the references contained in the bibliographies are never referred to in the text. The absence of titles is therefore unfortunate, in that the reader cannot judge as to the content of many of the articles quoted. The index could be improved.

Despite these criticisms, the reviewer believes that this is the best book in English on the subject published in recent years. The student of joint diseases will wish it had been written by a more experienced authority and that the subject matter had been presented in a more scholarly manner.

Manson's Tropical Diseases: A Manual of the Diseases of Warm Climates. Edited by Phillip H. Manson-Bahr, C.M.G., D.S.O., M.D., Senior Physician to the Hospital for Tropical Diseases, London. Eleventh edition. Cloth. Price, \$11. Pp. 1,083, with 397 illustrations. Baltimore: William Wood & Company, 1940.

The author continues to keep this book within the confines of a single handy volume. The provision of adequate discussions of so many complex diseases—kala-azar, plague, cholera, beriberi and other vitamin deficiency diseases, yellow fever, leishmaniasis, trypanosomiasis, malaria, yaws, leprosy, bilharziasis, rabies, typhus, undulant fever and numerous others—within one volume is a task which has been well done in this instance. Much ancient history has been deleted from the text and in its place are chapters on the preparation for life in the tropics, and a concise summary of the influence of the tropics in altering the facies of common diseases encountered in ordinary medical practice. Greater attention in this edition has been given to the subject of nutrition. Considerable revision has been made of the chapters on yellow fever, typhus and malaria, to make room for which the chapters on technic have been omitted. Mosquitoes, flies, fleas, worms, poisonous reptiles and fish, and the numerous microscopic causes, contribute toward making tropical diseases one of the most interesting subjects in medicine. This book emphasizes that fact very well.

Allergie und Tuberkulose: Allergische und verwandte Phänomene bei Tuberkulose. Von Dr. Franz Ickert, Oberregierungs- und Obermedizinalrat in Stettin. Boards. Price, 5.60 marks. Pp. 142, with 10 illustrations. Leipzig: Georg Thieme, 1940.

Because many observers utilize their own nomenclature and introduce new hypotheses and theories, discarding all prior conceptions so that it is difficult for the novice to compare different observations on allergy, particularly allergy in tuberculosis, Ickert presents in this small book the important allergic and related phenomena in tuberculosis freed as much as possible from the numerous theories and hypotheses. He subscribes to the Pirquet expression of 1906 "for the general conception of changed reaction ability I use the expression 'allergy.'" Under allergy in general he points out von Bergmann's observations of changed reactions in man to previous contact with mercury and iodine. In 1873 Blackley pointed to certain idiosyncrasies; in 1891 Koch demonstrated his "basic experiment"; Richet in 1902 produced "anaphylactic shock" and Arthus in 1903 produced the local subcutaneous or intracutaneous phenomenon considered an antigen antibody reaction resulting in the allergic reaction. The antigen antibody reaction does not occur in the blood or body fluids but in the cells, and this can be transferred passively (Prausnitz-Küstner 1922). Hyperergic inflammation possesses two phases, the exudative and the productive. The vegetative nervous system may play a part in the reactions. Certain so-called allergic diseases occur in man, probably tonus changes in the contractile elements and exudative reactions of the vascular connective tissue apparatus. In every tuberculous stage the existing allergy and the resistance of the organism as well as the amount of bacilli determine the form of tuberculosis, according to Ickert. The tuberculin reaction is dependent on the amount of tuberculin used and the height of hypersensitiveness. The tuberculin reaction is essentially specific but can display nonspecific effects. Many factors can influence its outcome. According to von Hayek, a high sensitivity is "hyperergy" and an abnormally low one "hypergy." "Normergy" exists with negative Pirquet and intracutaneous tests in the noninfected. "Euergy" exists with Pirquet negative, and intracutaneous reaction with 10^{-3} old tuberculin is "positive anergy"—the skin is able to destroy tuberculin. Nonspecific skin anergy exists under constitutional skin reactions or following certain diseases (measles). When the specific reaction power is so depressed that no reaction occurs to concentrated tuberculin, "dysergy" exists or "anergy" (of cachexia, starvation, old age).

The reactions in the various types of tuberculosis and related diseases are presented and elucidated by Ickert. Rössle considers (1) allergy with specific antigen antibody reaction, (2) parallergy occasioned by certain groups such as other infections and intoxications, and (3) pathergy, the reactions due to all other nonspecific irritants. Among constitutional influences on allergy are age, metabolism diseases such as diabetes and exophthalmic goiter, cardiovascular diseases, articular rheumatism, exudative lymphatic diatheses, and so on. When such diseases occur with tuberculosis, its outcome is determined by whether these diseases are related to syntropy or dystropy. The allergy acts as an accentuation factor of the syntropy or dystropy. Immunity and allergy as well as the Ranke teachings are given space, and finally desensitization is considered. In a final summarizing chapter Ickert points out that allergy is to be viewed as an independent biologic function. Thus also tuberculosis must be analyzed as a "changed reaction relation" of the organism. Each stage begins with an exudative phase which concludes with the specific granuloma, the tubercle. The former is associated with a high, the latter with a moderate allergic, hypersensitiveness. The height of the tuberculin threshold sometimes indicates the new tuberculosis stage earlier than the roentgenogram. The tuberculin and complement fixation reactions occur in reversed relation. Not only specific heightened hypersensitiveness but other sources of hypersensitiveness, such as other infections and focal toxicoses, exert an influence. Infections of all types occasion a disposition to such parallergic and pathergic reactions. On the other hand, an active tuberculous focus may act parallergic or pathergic toward other irritants. The disclosure of constitutional factors in individual cases may prove valuable (prognostically). Allergy in tuberculosis, as in some other diseases, assumes an important role which must not be forgotten—it leads us through analysis of the disease of an organ

to that of the disease of the individual and of the afflicted family for evaluation of man's entirety with relation to the family ancestry.

The book concludes with a good bibliography and a workable subject index of two pages. Although Ickert uses mainly German literature and expresses primarily his own views resulting from years of analysis, his conclusions are drawn rationally and are worth consideration by all interested in the practical field of allergy, especially as it pertains to tuberculosis in its various phases and as it is related to other diseases. The ten illustrations, mostly x-ray films, are well presented. This small textbook is in German and can be recommended for the personal as well as the tuberculosis and medical library.

A New Dictionary of Chemistry. Edited by Stephen Miall, LL.D., B.Sc. With the Assistance of Many Well-Known Chemists. Cloth. Price, \$15. Pp. 575. New York, Toronto & London: Longmans, Green & Company, 1940.

Chemical science is advancing rapidly. The additions to chemistry and the related sciences have led to new methods of description and designation. To clarify this complexity the author, assisted by many well known chemists, has compiled a single volume of definitions and brief discussions of chemical terms the keynote of which is conciseness. This is not only a dictionary of chemistry but a great source of accurate chemical information conveniently arranged. The chemical elements are each included in a separate entry and the entire series is reviewed under such headings as the elements and their electrons, isotopes and the periodic table. Some compounds of the elements are also surveyed and their crystal structures as revealed by x-ray analysis are indicated by diagrams. There is included also a roll of notable chemists of the present and past generations, with the more important achievements of each individual. The dictionary is intended to be useful not only to chemists but to many others—doctors, druggists, chemical manufacturers, lawyers, journalists—who desire to refresh their memories about a subject which they have partly forgotten.

Anatomy and Physiology Laboratory Manual and Study Guide. By Barry Griffith King, Ph.D., Assistant Professor of Physiology, College of Physicians and Surgeons, Columbia University, New York, and Helen Maria Roser, B.A., R.N., Instructor in Nursing, Department of Nursing, College of Physicians and Surgeons, Columbia University, New York. With a foreword by Isabel M. Stewart. Paper. Price, \$2.75. Pp. 273, with 63 illustrations by M. Cartwright Baker. Philadelphia & London: W. B. Saunders Company, 1940.

This manual was prepared specifically for use in schools of nursing but would be applicable to college courses as well. It is based on the experience of the authors in actual laboratory work. The loose leaf arrangement is similar to other laboratory manuals in use. The division and sequence of subject matter are logical and well integrated. Many of the questions asked appear to be rather too simple for stimulating thought and might be characterized as "leading questions." On the other hand, many of the exercises call for independent observation and initiative. Directions for dissection are well illustrated with original sketches. An admirable feature is the large number of experimental observations that the students are required to make with themselves or mates as subjects. Throughout there is good integration of anatomy and physiology. In the appendix are several pages of descriptive and explanatory notes which should greatly simplify the work for those unfamiliar with laboratory equipment and technic.

Man Alive You're Half Dead! A Physician Tells You How to Eat Your Way to Glowing Health . . . and Stay There. By Daniel Collin Munro, M.D., Medical Director of the Lake Placid Club, New York. Cloth. Price, \$2. Pp. 209. New York: Dudley Courtenay, Publisher, 1940.

On the basis of many undisputed facts this book promulgates in a slightly modified form the typical fallacies of food faddism, including the compatible eating fad and such unsupported theories as that coronary thrombosis is most commonly caused by deficiency of vitamin C. Excessive emphasis is placed on the unestablished belief that gelatin is valuable for "revitalizing those who are chronically weak and tired." The necessity for taking yeast and vitamin concentrates is excessively emphasized. The book cannot be classed among those which can be recommended to lay inquirers seeking authentic information about diet and health.

Report on the Sex Question. By The Swedish Population Commission. Translated and edited by Virginia Clay Hamilton, M.D. Statens Offentliga Utredningar 1936: 59, Stockholm. Published for National Committee on Maternal Health, Inc. Cloth. Price, \$2. Pp. 182. Baltimore: Williams & Wilkins Company, 1940.

This is a translation and edited edition of a report of the Swedish Population Commission. It offers an analysis of the use of contraception in Sweden, giving at the same time a study of the relationship of contraception to housing, nutrition, health and innumerable other aspects of life. It discusses various technics of contraception and reaches the conclusion that the combination of ointment and pessary, which are wholly under the control of the female, represents the preferred technic. It recognizes also, however, that all technics are subject to error and that the ideal is not yet available. There is a discussion as well of the problems of the control of venereal disease and of sex enlightenment. The commission is inclined to favor the use of any type of mechanical or chemical effort that will prevent the transmission of venereal disease and believes in sex enlightenment applied through schools and through the home in order to secure more widespread use of such methods. As a result of this report a number of measures were passed by the 1937 Swedish legislative body, including maternity aid in the form of cash, aid for orphan children, loans for the purchase of homes or furniture for engaged and newly married couples, modification of the school curriculum to include sexual enlightenment and repeal of the old Swedish contraceptive law.

Chambers's Technical Dictionary Comprising Terms Used in Pure and Applied Science: Medicine: the Chief Manufacturing Industries: Engineering: Construction: the Mechanic Trades. With Definitions by Recognized Authorities. Edited by C. F. Tweney and L. E. C. Hughes, A.C.G.I., D.I.C., B.Sc. Cloth. Price, \$5. Pp. 957. New York: Macmillan Company, 1940.

The need for an adequate dictionary of technical terms in different fields is readily apparent. This dictionary is aimed at giving "definitions of terms that are of importance in pure and applied science, in all branches of engineering and construction, and in the larger manufacturing industries and skilled trades." The commoner medical terms are reasonably well covered, but many of the more technical ones such as "adiadokocinesis" and "agoraphobia" do not appear. This is not said by way of criticism, since there would ordinarily be little use in including the rarer terms of this nature in a general technical dictionary. In general this dictionary may be expected to serve a useful purpose which subsequent editions may enhance.

Observations Made During the Epidemic of Measles on the Faroe Islands in the Year 1846. By Peter Ludwig Panum, M.D. Translated from the Danish by Ada Somerville Hatcher. With a Biographical Memoir by Julius Jacob Petersen, M.D. Translated from the Danish by Joseph Dimont. Introduction by James Angus Doull, M.D. Published by the Delta Omega Society. Cloth. Price, \$2.50. Pp. 111, with portrait. New York: American Public Health Association, 1940.

This book is published by the Delta Omega Society in memory of Wade Hampton Frost, epidemiologist. It is the third public health classic republished by the society, the first being Budd's Typhoid Fever, the second Snow's Cholera. In his introduction the editor, J. A. Doull, describes the conditions under which Panum worked and analyzes ably the significance of his great contribution to the epidemiology of measles. Then comes a translation by Joseph Dimont of Julius J. Petersen's highly interesting sketch of Panum's career and personality (*Nord. med. Ark.* 17:1 [No. 24] 1885). The translation of Panum's Observations was made by Ada S. Hatcher in 1924 and was published in Medical Classics, 1939. The present edition has been revised and corrected. "Efforts have been made to be as literal as is consistent with an intelligent rendering and to catch in the translation something of the quaintness of Panum's style." In appendixes are notes by the editor and the translators as well as translations of two other Danish reports on the 1846 Faroe measles epidemic. By his observations on the spread of measles in the Faroe Islands in 1846, recorded with wonderful clarity and precision, Panum made a "contribution to epidemiology which will stand for all time." The republication in English translations of Panum's report and of Petersen's sketch of Panum is of interest to all students of infectious epidemiology and of medical history.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Hospitals: Criteria of Charitable Character for Tax Purposes.—The R. B. Smith Memorial Hospital Association, located at Alma, Mich., was organized as a nonprofit corporation, the community of Alma subscribing approximately \$24,000 to equip it. According to the evidence, although the hospital association made a book charge against every patient who received its services, it attempted collection only from those actually able to pay in full or in part. County patients and afflicted children were treated at less than cost, and indigents were treated without cost, the uncollected accounts of such patients amounting to approximately \$3,500. During certain periods revenue exceeded expenditures, while in others it did not. Whenever a deficit resulted it was met by further donations from the community. On those few occasions when there was no deficit, the surplus was used to finance new equipment or additions to the hospital. No dividends had ever been paid to, or expected by, the members of the hospital association. The auditor general of Michigan, contending that the defendant association was not exempt from the real property tax as a charitable organization, petitioned for the sale of certain lands for taxes assessed against the association. From the judgment of the trial court holding that the defendant was exempt from taxation, the auditor general appealed to the Supreme Court of Michigan.

The definition of a charitable institution for purposes of tort law, said the Supreme Court, is not conclusive in a tax exemption case, in which case the exemption is to be construed strictly. As was held in *Michigan Sanitarium & Benevolent Ass'n v. City of Battle Creek*, 138 Mich. 676, 101 N. W. 855, for tax purposes a corporation is sufficiently charitable to entitle it to the privileges of exemption when the charges collected for its services are not more than are needed for its successful maintenance. Under this doctrine, in the opinion of the court, the defendant was clearly entitled to exemption from taxation. The auditor general's argument that the defendant should be tested each year, apparently on the theory that it would be subject to a tax in those years in which it operated at a profit, did not meet with the court's approval. Such a procedure would be absurd. By bobbing back and forth and calling the defendant tax exempt one year and not exempt another year, "all sorts of trouble" would result. The real test is what is the situation from year to year and is the hospital association operated for the benefit of its members or for the benefit of the community, in which case it would be a charitable organization. In the judgment of the court, the defendant hospital association operated a public and not a private hospital. The hospital was operated "without gain, profit or advantage to any one." The association did not lose its charitable character even though in some years, instead of the usual deficit, it showed a small surplus which it utilized to supply needed equipment. Judgment for the defendant was therefore affirmed.—*Gundry, Auditor Gen. v. R. B. Smith Memorial Hospital Ass'n (Mich.)*, 291 N. W. 213.

Malpractice: Liability of Physician for Failure to Take Roentgenograms Before Attempting to Remove Broken Needle.—The defendant, a specialist in diseases of the ear, nose and throat, was engaged to remove the plaintiff's tonsils. His assistant, while injecting procaine hydrochloride into the tonsillar area of the plaintiff's throat, broke off the point end of a hypodermic needle which became embedded in the tissues of plaintiff's throat. The assistant called the defendant and informed him of the mishap. After a physical examination of the plaintiff's throat it was decided that the broken needle might be embedded in the tonsil and that it would be best to proceed with the removal of that organ. This was done, but the broken needle was not contained in the removed tonsil. The defendant then made two attempts, for periods of forty-five minutes and twenty-five minutes respectively, to remove the broken needle by probing from the inside, but he was un-

successful. He then sent the plaintiff home with instructions to return to his office in about ten days. On the patient's return, the defendant caused roentgenograms to be taken and made another unsuccessful attempt to remove the broken needle. So far as the report shows, the needle was never removed in spite of attempts by other physicians to do so. The plaintiff later brought suit for malpractice against the defendant and obtained a judgment in his favor in the trial court. This judgment, however, was reversed by the supreme court of New York, appellate division, second department, and the plaintiff appealed to the Court of Appeals of New York.

The plaintiff did not claim that the defendant or his assistant was negligent in breaking the needle. He did contend, however, that the defendant was negligent in failing to take roentgenograms immediately after the mishap to determine the location of the broken needle and in futilely probing for the needle when such procedure would likely push it still farther into the tissues of the plaintiff's throat. At the trial, "while there was strong evidence to the contrary," the plaintiff's expert medical witness, also a specialist in diseases of the ear, nose and throat, testified that under the circumstances it was not proper medical practice for the defendant to proceed with the tonsillectomy; that, since a broken needle does not remain stationary but is immediately sucked into the muscles, it was not good practice to attempt to remove the broken needle without first having taken roentgenograms and located the position of the fragment, and that it was folly for the defendant to attempt to remove the fragment by probing because the only practical way to remove it was from the outside through an incision in the neck. He would not say that there was no possibility of success in the method employed by the defendant "because coincidence plays a big part." In his opinion, the defendant's operation was "a departure from approved methods in general use" at the time.

The testimony of the plaintiff's expert witness, said the Court of Appeals, was not merely to the effect that the witness would have treated the patient differently but rather that the method adopted by the defendant was not proper and approved practice. In the opinion of the court, the witness's testimony was not nullified, as the supreme court believed, by his admission that probing might have been successful. By so testifying the witness merely allowed for coincidence. His testimony, in effect, was that the defendant might have gotten hold of the broken needle by probing from the inside but that the proper and approved practice was to remove it from the outside. The court concluded that, while the evidence in favor of the defendant was strong and on the weight of the evidence the result reached by the supreme court may have been correct, it cannot be said that there was no evidence to support the jury's verdict for the plaintiff. Accordingly, the judgment of the trial court in favor of the plaintiff, which the supreme court had reversed, was reinstated.—*Bernstein v. Greenfield (N. Y.)*, 22 N. E. (2d) 242.

Society Proceedings

COMING MEETINGS

- American Academy of Pediatrics, Memphis, Tenn., Nov. 18-20. Dr. Clifford G. Grulee, 636 Church Street, Evanston, Ill., Secretary.
- American Society of Anesthetists, New York, Dec. 12. Dr. Paul M. Wood, 745 Fifth Ave., New York, Secretary.
- American Student Health Association, Ann Arbor, Mich., Dec. 27-28. Dr. Ralph I. Canuteson, University of Kansas, Lawrence, Kan., Secretary.
- Eastern Section, American Laryngological, Rhinological and Otolological Society, Philadelphia, Jan. 10. Dr. N. S. Weinberger, Robert Packer Hospital, Sayre, Pa., Chairman.
- Puerto Rico Medical Association of, San Juan, Dec. 13-15. Dr. David E. Garcia, P. O. Box 3866, Santurce, Secretary.
- Radiological Society of North America, Cleveland, Dec. 2-6. Dr. Donald S. Childs, 607 Medical Arts Bldg., Syracuse, N. Y., Secretary.
- Society of American Bacteriologists, St. Louis, Dec. 27-29. Dr. I. L. Baldwin, Agricultural Hall, University of Wisconsin, Madison, Wis., Secretary.
- Southern Section, American Laryngological, Rhinological and Otolological Society, Nashville, Tenn., Jan. 8. Dr. William G. Kennon, Doctors Bldg., Nashville, Tenn., Chairman.
- Southern Surgical Association, Hot Springs, Va., Dec. 10-12. Dr. E. Alton Ochsner, 1430 Tulane Ave., New Orleans, Secretary.
- Southwestern Medical Association, Tucson, Ariz., Nov. 21-23. Dr. M. P. Spearman, 1001 First National Bank Bldg., El Paso, Texas, Secretary.
- Western Surgical Association, Topeka, Kan., Dec. 6-7. Dr. Albert H. Montgomery, 122 South Michigan Blvd., Chicago, Secretary.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Ophthalmology, St. Louis

23:971-1088 (Sept.) 1940

Retinal Lesions in Lupus Erythematosus. A. E. Maumenee, Baltimore.—p. 971.

Concerning the Chamber Angle: II. Exfoliation of Zonular Lamella and Glaucoma Capsulare. H. S. Gradle and H. S. Sugar, Chicago.—p. 982.

Retinal Changes with Marked Impairment of Vision in Measles: Report of Case. F. R. Shlossberg and M. Prizer, Haverhill, Mass.—p. 998.

Inherited Eye Defect in the Guinea Pig: Report of Further Anatomic Studies. H. L. Foust, Ames, Iowa.—p. 1000.

Treatment of Sequels of Perforated Corneal Ulcer: Note. P. C. Kronfeld, Chicago.—p. 1014.

Management of Some Complications Which Follow Cataract Extraction. E. B. Spaeth, Philadelphia.—p. 1019.

Conjunctival Lesions in Tuberculous Sclerosis. T. H. Luo, Peking, China.—p. 1029.

Am. J. Roentgenol. & Rad. Therapy, Springfield, Ill.

44:325-484 (Sept.) 1940

Abnormally Wide Respiratory Movement of Lower Lung Structures: Roentgen Evidence of Obstructive Emphysema. R. Golden, New York.—p. 325.

*Roentgenologic Aspects of Epidemic of Acute Respiratory Tract Infection. K. Kornblum and H. A. Reimann, Philadelphia.—p. 333.

Roentgen Aspects of Nonpurulent Pulmonary Suppuration. M. L. Sussman, New York.—p. 345.

Basal Exudates of Subphrenic Origin. L. R. Sante, St. Louis.—p. 350.

Primary Carcinoma of Lung: Roentgenologic Study of 206 Proved Cases. J. W. Olds and B. R. Kirklin, Rochester, Minn.—p. 357.

Recent Progress in Bronchographic Examination of Bronchogenic Carcinoma. P. L. Fariñas, Havana, Cuba.—p. 370.

Roentgenologic Observations in Leprosy. M. J. Oberdoerffer and D. R. Collier, Chiangmai, Thailand.—p. 386.

Xanthomatosis (Lipoidosis, Schüller-Christian Type): Report of Case. D. S. Kellogg, Fort Sam Houston, Texas.—p. 396.

Effect of Fractional Roentgen Irradiation on Several Groups of Inoperable Tumors. C. Fried, São Paulo, Brazil.—p. 401.

Debt of Radiology to the Thomsons and the Thompsons, Physicists and Engineers: Historical Memoir. P. Brown, Egypt, Mass.—p. 409.

Principles of Relationship Between Hospitals and Radiologists. B. R. Kirklin, Rochester, Minn.—p. 423.

Measurement in Roentgens of Gamma Radiation from Radium by Free Air Ionization Chamber. L. S. Taylor and G. Singer, Washington, D. C.—p. 428.

Further Studies on Role Played by Certain Normally Occurring Intracellular Chemical Compounds in Growth and Development. S. P. Reimann, Philadelphia.—p. 444.

Roentgenologic Aspects of Epidemic of Acute Respiratory Tract Infection.—Kornblum and Reimann present x-ray data of eighty-six patients who suffered from acute epidemic infection of the respiratory tract which occurred in January 1939. This study was prompted by the fact that from two patients in a small series of similar cases which occurred sporadically during 1938 a filtrable infectious agent was recovered and that the 1939 outbreak might be due to the same etiologic agent. The patients were medical students, nurses and interns of the Jefferson Medical College and Hospital, making a total of 813 persons, 407, or 50 per cent, of whom at some time between January and May 1939 were ill with the disease. Of the 407 patients, about 100 required hospital care, and of these eighty-six were studied roentgenologically. There were no fatalities, indicating the relatively mild character of the disease. The condition was primarily an inflammation of the mucous membrane of the respiratory tract, occasionally including the trachea and bronchi, and in a few instances the bronchioles and lungs. The majority of the patients (87 per cent) were ill with nasopharyngolaryngitis, 7 per cent had in addition tracheobronchitis and 6 per cent had tracheobronchopneumonia. The disease with pneumonia lasted from two to seventeen days, averaging 8.2 days. The disease was considered a distinct clinical entity similar to epidemic influenza but

caused by a different agent. Many features of the disease suggest that a filtrable virus is the cause. According to the x-ray signs, of the eighty-six patients forty were normal, twenty-four had an acute tracheobronchitis and twenty-two had an atypical pneumonia. There was a striking agreement between the clinical and the x-ray observations. Only four patients considered negative roentgenologically were clinically diagnosed as having acute tracheobronchitis. Two patients with an x-ray diagnosis of acute tracheobronchitis were clinically considered to have pneumonia. Roentgenologically no diagnostic difficulties were encountered in the recognition of the normal persons and those with pneumonia (atypical). The diagnosis of acute tracheobronchitis afforded considerable opportunity for error, as the general appearance is similar to that found in the chronic condition except that the shadows are less well defined, present a distinctly blurred appearance, and are less dense and of a softer character, and often there is small soft mottling in the pulmonary tissues about the hilus area. Of considerable importance is the generalized haziness throughout the lung field, giving the impression of an underexposed roentgenogram. This is evidently the result of an active congestion of the interstitial blood vessels throughout the lungs. The lateral view of the chest was of considerable value in recognizing acute tracheobronchitis and in differentiating it from the chronic variety. The pulmonary changes in the twenty-two patients were sufficient to warrant the diagnosis of pneumonia. A distinctive feature was a well localized but not large area of increased density, usually in the lower lobes of the lung. Although localized, the inflammatory reaction was not sharply defined. The inflammatory process spread and sometimes became bilateral. Another common lesion was a diffuse but not very dense pneumonic process at one base. The condition frequently became bilateral. In several cases the pneumonia showed a predilection for the hilus region, either unilateral or bilateral, presenting an x-ray appearance similar to the pneumonia seen in epidemic influenza. At times the pneumonic reaction was indicated by a barely perceptible haziness, its recognition depending on the diffuse unilateral or bilateral mottling in the involved area. As most of the patients were examined early, x-ray changes were evident in several cases before physical signs warranting a clinical diagnosis of pneumonia appeared, thus suggesting the probable development of pneumonia in a certain location. The x-ray changes tended to persist for some time after the apparent recovery of the patient. No pulmonary or pleural complications occurred and all the patients recovered.

American Review of Tuberculosis, New York

42:297-430 (Sept.) 1940

*Pathogenesis of Bronchiectasis. F. Fleischer, Boston.—p. 297.

Meningeal Blood Vessels in Tuberculous Meningitis. N. W. Winkelman and M. T. Moore, Philadelphia.—p. 315.

Carcinoma and Tuberculosis of Lung. C. E. Hamilton and N. H. Wexler, Brooklyn.—p. 334.

Tuberculosis in Rabbits: Further Comparison of Roentgenologic and Pathologic Findings in Primary and Reinfection Experimental Pulmonary Tuberculosis in Rabbits: Part I. Primary Tuberculosis.

H. E. Burke, Ray Brook, N. Y.—p. 343.

Urinary Iodine in Pulmonary Tuberculosis. K. P. Klassen, G. M. Curtis and R. A. Hancock, Columbus, Ohio.—p. 376.

Epidemiologic Trends of Tuberculosis. M. Pinner, New York.—p. 382.

Technic of Cavity Aspiration (Monaldi). E. Kupka and Ruth Wells, Olive View, Calif.—p. 401.

Pathogenesis of Bronchiectasis.—Fleischer reports three cases of benign bronchial tumors which seem to contribute to the knowledge of the pathogenesis of bronchiectasis. The three cases are regarded as different developmental stages of the same disease. In the first case, the earliest stage, there is a stenosis and beyond it obstructive emphysema without other gross pathologic pulmonary or bronchial changes. The third case represents a late stage with complete collapse of the lobe beyond the stenosis and marked purulent bronchiectasis. In the second case the growing intrabronchial tumor apparently caused a collapse of the left lower lobe with dry bronchiectasis. A superimposed purulent bronchitis led to its discovery. Pathogenically the second case is placed between the first and the last. These cases seem to demonstrate the underlying causative factor of bronchiectasis with the clearness of an experiment. In the beginning there is bronchial stenosis without other changes.

It impairs the air current in the affected lobe. The consequences of this disturbed ventilation to the lung are manifold and intricate, even if the interference with gas exchange is omitted. The decrease in ventilatory exchange means a decrease in respiratory plasticity of the lung and this raises difficulties in the spatial adjustment during the alternating phases of respiration. The next step is retention of secretion in small bronchi and bronchioles, as ineffective hawking and coughing due to the deficient respiratory air current decrease the self-cleansing capacity of the lung. The retained secretion will plug small bronchi, and atelectasis of the obstructed portions of parenchyma may ensue. Concomitant infections of the respiratory tract may intensify this series of events. Stenosis of a main or lobar bronchus or from an aspirated foreign body represents only one of several possible occurrences which reduce the ventilation. The occlusion of small peripheral bronchi and bronchioles appears to be a further indispensable link in the pathogenesis of bronchiectasis. In acute infections, chronic lesions of the respiratory tract and general or localized impairment of respiratory efficiency, bronchial occlusions occur which eventually lead to circumscribed atelectasis. Further decisive factors are the size of the involved area, the kinds and degrees of mechanical hindrances, the ability of the adjacent structures to perform the special adjustment and the rate of the primary collapse and the engorgement, the speed of the resorption of this edema and the period of time over which the atelectasis persists. The author conceives the development of bronchiectasis to be as follows: By diminution of the respiratory efficiency of a lung, a lobe or a portion of a lobe, the ability to get rid of secretion is impaired, the physiologic secretion is inadequately removed and small bronchi are blocked, or bronchi may be blocked because of an increased amount of secretion owing to inflammation, swelling of mucous membranes, granulation tissue or scars. These changes, singly or together, produce the conditions of preatelectasis and atelectasis. Stiffening and contraction of the tissue effect a pathologically increased pull on the bronchial wall, thus expanding the bronchus. The dilatation is first reversible but later becomes a permanent one if the intervening factors last for a long time. Atelectasis hampers the removal of secretion and causes inefficient ventilation of the neighboring parenchyma. Thus the condition becomes chronic and involves the surrounding normal portions. The inflammation with ensuing weakening of the bronchial wall may favor the development of bronchiectasis.

Archives of Dermatology and Syphilology, Chicago

42:543-754 (Oct.) 1940

- Cultural Aspects of Dermatologic Thought. F. C. Knowles, Philadelphia.—p. 543.
- Treatment of Acne Vulgaris by Cryotherapy (Slush Method). W. L. Dobes and H. Keil, New York.—p. 547.
- Late Syphilis with Rare Orbital Gumma: Report of Case. H. R. Sniderman, Toronto, and E. A. Glicklich, Cincinnati.—p. 559.
- Black Hairy Tongue: Report of Three Cases. C. B. Kennedy and J. K. Howles, New Orleans.—p. 566.
- Xeroderma Pigmentosum in Negriss. H. King and C. M. Hamilton, Nashville, Tenn.—p. 570.
- Treatment of Dermatomyiasis Pedis with Medicated Insoles. M. Seldowitz, Brooklyn.—p. 576.
- Generalized Herpes Zoster Associated with Leukemia. U. J. Wile and H. H. Holman, Ann Arbor, Mich.—p. 587.
- Acne Vulgaris: Review of Histologic Changes Observed in Early Lesions. F. W. Lynch, St. Paul.—p. 593.
- Lichen Planus of Nail Bed: Report of Case. G. M. Lewis, New York, and J. F. Ricchiuti, Mahanoy City, Pa.—p. 607.
- Microsporosis of Scalp Caused by Microsporum Fulvum: Report of Case and Description of Fungus. M. Moore and A. H. Conrad Jr., St. Louis.—p. 610.
- Extensive Lichenified Eruption Caused by Trichophyton Rubrum. J. H. Swartz, Boston, and N. F. Conant, Durham, N. C.—p. 614.
- Micropapular Tuberculid. C. W. Laymon and H. E. Michelson, Minneapolis.—p. 625.
- *Arsenic as Cause of Cancer of Mucous Membrane: Report of Case. W. H. Goeckerman and L. F. X. Wilhelm, Los Angeles.—p. 641.
- *Treatment of Chancroid with Sulfanilamide. O. Canizares, New York, and J. A. Cohen, Brooklyn.—p. 649.
- Familial Lichen Planus: Report of Four Cases of Lichen Planus in One Family, with Brief Review of Literature. M. H. Saffron, Passaic, N. J.—p. 653.

Arsenic as Cause of Mucous Membrane Cancer.—Goeckerman and Wilhelm report a case in which common cutaneous lesions produced by arsenic were present and following its use the metal was demonstrated by microchemical studies

in a papilloma and a carcinoma of the mucous membranes of the ureter and bladder, indicating that arsenic was at least a factor in their production. The patient presented classic arsenical keratoses of the palms of the hands and the soles of the feet. The keratoses of the trunk and extremities were of the arsenical rather than of the superficial epitheliomatosis type. Some of the keratoses suggested Bowen's disease. A section of a simple keratotic lesion of the trunk showed dermatitis and the presence of arsenic crystals in moderate amount, which is not necessarily of etiologic significance. In the potentially malignant ureteral papilloma, arsenic was demonstrated in a moderate amount and in the vesical papillomas in a considerable amount. The authors believe that their case is the only one of its kind so far reported suggesting that either cancer of the mucous membranes due to hematogenous distribution of arsenic is rare or the subject has not been investigated sufficiently.

Treatment of Chancroid with Sulfanilamide.—Canizares and Cohen present data on the comparative results of treating chancroid with sulfanilamide and local compresses soaked in a 1 to 5,000 solution of potassium permanganate and of iodoform powder and intravenous injections of Ducrey and typhoid vaccine. The authors considered the action of vaccine to be non-specific. Patients treated with sulfanilamide had local dressings wet only with saline solution. The usual daily dosage of sulfanilamide was 75 grains (5 Gm.) divided into three doses for three days and 45 grains (3 Gm.) daily thereafter. Toxic symptoms were relatively uncommon. Sixty-four of ninety-three patients with lesions classified as small chancroids received sulfanilamide. The average time required for cure was twelve days. The condition in the twenty-nine control patients disappeared in an average of 11.6 days. Local therapy failed to control the lesions of four patients and these were later controlled by another type of local treatment. This never happened with sulfanilamide. Of sixty-eight patients with large chancroids, thirty-eight received the drug and required eighteen days for cure. The lesions of the thirty control patients healed in 22.7 days. Two of the sulfanilamide group and one of the control relapsed. Of seventeen patients with phagedenic chancroids, six control patients were cured in an average of thirty-five days. The lesions of two relapsed. Six of the eleven patients treated with sulfanilamide were healed in 27.6 days. However, the remaining five did not respond to this form of therapy, necessitating a change to iodoform powder followed by cure. Of the patients with inguinal adenopathies there were thirty-nine with unruptured and twelve with ruptured buboes. Rest in bed was given until the acute inflammatory symptoms had subsided. The buboes were aspirated whenever this was required. Local therapy (wet dressings, ice bags, the injection of iodoform in glycerin and vaccinotherapy) accomplished the desired effect in sixteen days in twenty of the unruptured cases and in nineteen days in the nineteen cases of the sulfanilamide series. This is an evident lack of superiority of the drug in this manifestation. Four control patients with ruptured buboes healed in an average of fifty-one days. The remaining eight received sulfanilamide and were cured in twenty-one days. The authors conclude that there is no advantage in giving sulfanilamide to patients with small and uncomplicated chancroids. Local therapy seems to be sufficient. If prompt control is not obtained, sulfanilamide is to be given. For large chancroids, sulfanilamide associated with local therapy should be used. In phagedenic chancroid it should be tried in conjunction with local therapy. Sulfanilamide does not decrease the formation of pus. It is most efficacious for ruptured buboes. Sulfanilamide should not be used in a routine manner but with knowledge of its value and indications.

Archives of Physical Therapy, Chicago

21:513-576 (Sept.) 1940

- Evolution of Physical Therapy in Medicine. N. H. Polmer, New Orleans.—p. 517.
- Effect of Cold, Heat and Weather on the Human Being. W. F. Petersen, Chicago.—p. 522.
- Fever Therapy by Physical Means in Dermatology. K. Phillips and A. B. Litterer, Miami, Fla.—p. 533.
- Hysterosalpingography a Deciding Factor in Management of Female Pelvic Pathology. G. Lyford and B. Billman, Cincinnati.—p. 541.
- Radium and X-Rays in Treatment of Cancer of Head and Neck. G. S. Sharp, Pasadena, Calif.—p. 549.

Arkansas Medical Society Journal, Fort Smith

37:93-112 (Oct.) 1940

Surgical Relief of Pain. J. J. Keegan, Omaha.—p. 93.
Cesarean Section. C. R. Henry, Little Rock.—p. 96.

Florida Medical Association Journal, Jacksonville

27:113-164 (Sept.) 1940

Infection of Nasal Accessory Sinuses in Children. W. W. Quillian, Coral Gables.—p. 127.
Otolitic Progress. M. A. Lischkoff, Pensacola.—p. 130.
Water Metabolism. E. P. Preston, Miami Beach.—p. 133.
Isolated Myocarditis. E. C. Chamberlain, Fort Lauderdale.—p. 137.
Inguinal Hernia: Analysis of 204 Operations. D. C. Robertson, Orlando.—p. 140.
Kidney Infections as Result of Obstruction. C. F. Bowie, Leesburg.—p. 144.
Venereal Disease Control. G. F. Highsmith, Arcadia.—p. 147.

Georgia Medical Association Journal, Atlanta

29:429-474 (Sept.) 1940

Sulfanilamide and Its Derivatives. E. A. Allen, Atlanta.—p. 429.
Treatment of Cardiac Edema. E. A. Bancker Jr., Atlanta.—p. 436.
Infantile Diarrhea. C. D. Fowler, Atlanta.—p. 442.
Use of Nicotinic Acid in Pellagra and Other Conditions. A. E. Siegel, Macon.—p. 447.
Intensive Fractional Treatment of Early Syphilis: Preliminary Report. J. S. Howkins, Savannah.—p. 452.
The Good of Yesterday. R. S. Leadingham, Atlanta.—p. 455.

Iowa State Medical Society Journal, Des Moines

30:465-508 (Oct.) 1940

*Acoustic Neuroma Producing Tic Douloureux. W. D. Abbott and B. M. Merkel, Des Moines.—p. 465.
Generalized Itching. R. Nomland, Iowa City.—p. 468.
Headache. J. C. Parsons, Des Moines.—p. 470.
Backache: Medical Phases. H. W. Rathe, Waverly.—p. 473.
Id.: From Orthopedic Standpoint. A. F. O'Donoghue, Sioux City.—p. 476.
Backache as Seen by a Gynecologist. W. F. Mengert, Iowa City.—p. 480.
Indigestion and Abdominal Pain. W. D. Paul, Iowa City.—p. 482.
X-Ray Anemia and X-Ray Death of Small Animals. M. C. Terry, Knoxville, and S. B. McFarland, San Francisco.—p. 486.
Appendicitis Deaths in 705 Necropsies. F. P. McNamara and R. V. McKay, Dubuque.—p. 487.

Acoustic Neuroma Producing Tic Douloureux.—According to Abbott and Merkel, only eighteen cases have been reported in which neuroma of the acoustic nerve produced typical pain resembling that of major trigeminal neuralgia. A woman aged 30 was referred to one of the authors because of pain in the right upper lip, nose and forehead. The pain was sharp and lancinating and was induced by touching the upper lip, talking or eating. Examination was negative except for a persistent trigger zone in the right upper lip; touching this area produced pain in the first and second branches of the right trigeminal nerve. Inhalations of trichlorethylene were tried temporarily. The pain became more intense and alcohol injection of the first and second branches of the right trigeminal nerve was performed. This freed the patient from pain for about seven months, after which pain returned with the same radiation as previously. Both corneal reflexes were present and equal. A repetition of the alcohol injection again rendered the patient free from pain. However, two months later she developed vertigo, nausea and vomiting. Examinations of the ears, nose and sinuses were negative. About a year after the second alcohol injection the facial pain recurred, although there was still anesthesia in the first and second branches of the right trigeminal nerve. Because of the history of an acute Ménière's syndrome and persistent anesthesia in the affected branches, exploration of the posterior fossa was advised with the possibility of an acoustic neuroma in mind. When the cerebellum was elevated, the fifth, seventh and eighth nerves were found stretched over a tumor mass the size of a large hazelnut. This was removed piecemeal and the nerves were left intact. The microscopic examination revealed acoustic neurofibroma. Recovery was uneventful. The patient has been free from pain and there has been a gradual return of the function of the facial nerve, so that she can close the eyelids and the nasolabial fold is present, but there is a drawing of the angle of the mouth on smiling and she is unable to whistle. Examination sixteen months after the operation revealed complete return of sensation over the right side of the face. The authors think that, when there is evidence of compression of the trigeminal sensory root and neighborhood signs such as

diminished or absent corneal reflex, Ménière's syndrome and loss of hearing accompanied by ataxia and incoordination of the extremities, it is well to consider the posterior approach to the sensory root. They stress that the more simple methods of inhalation of trichlorethylene and peripheral or deep alcoholic injection are not sufficient to produce permanent relief from pain, and they warn that there have been insufficient grounds to justify the sense of security which has been felt by advocates of the transtemporal approach to the posterior sensory root of the trigeminal nerve.

Journal of Nervous and Mental Disease, New York

92:281-428 (Sept.) 1940

Localized Nonsuppurative Encephalitis Secondary to Infections of Temporal Bone and Paranasal Sinuses: Report of Four Cases. J. C. Yaskin, Philadelphia.—p. 281.
Metrazol Remission in Severe Obsession Compulsion Neurosis of Five Years' Duration. M. Zeifert, Brooklyn.—p. 290.
Tonic Neck Reflexes and Tonic Fits Following Vascular Lesions in Brain Stem: Two Cases. A. B. King, Baltimore.—p. 302.
Observations and Results Obtained in Hypoglycemic Treatment of Schizophrenia. Anna R. Coyne, Washington, D. C.—p. 309.
Threat of Mental Disease. I. S. Wile, New York.—p. 323.
Adipositas Cerebralis and Emaciatio Cerebralis. A. Gordon, Philadelphia.—p. 342.
Meningeal Permeability and Metrazol Therapy. B. Skorodin, M. L. Fisher, L. Schlan, Manteno, Ill.; S. Maurer and H. O. Wiles, Chicago.—p. 348.

Journal of Pediatrics, St. Louis

17:279-422 (Sept.) 1940

Physical Complaints Without Organic Basis. Mary I. Preston, San Francisco.—p. 279.
*Nonspecific Mesenteric Lymphadenitis: Report of Fifty-Eight Cases. I. P. Sobel and D. Stetten, New York.—p. 305.
*Treatment of Cryptorchism with Chorionic Gonadotropic Hormone and Male Sex Hormone. C. Zelson and E. Steinitz, New York.—p. 315.
Statistical Study of Otitis Media in Children. G. Heller, Englewood, N. J.—p. 322.
Build Variations in Adolescent Girls. Leona M. Bayer, San Francisco.—p. 331.
Weight and Menses in Adolescent Girls, with Special Reference to Build. Leona M. Bayer, San Francisco.—p. 345.
*Method of Diagnosing Idiopathic Epilepsy. F. C. DeLorenzo, Newark, N. J.—p. 355.
Significance of Routine Nose and Throat Cultures for Diphtheria on Pediatric Admissions. C. M. Witzberger and L. B. Slobody, New York.—p. 360.
Bacillary Dysentery Acquired at Birth. M. Greenberg, S. Frant and Rebecca Shapiro, New York.—p. 363.
Study of Incidence of Illness Among Institutional Children. H. E. Thelander, San Francisco.—p. 367.
Foreign Body in Heart: Case Report. C. Petrillo, New Haven, Conn.—p. 378.

Nonspecific Mesenteric Lymphadenitis.—Sobel and Stetten report fifty-eight proved cases of mesenteric lymphadenitis. Forty-five of the patients were less than 15 years of age. There was no apparent correlation between the occurrence of the lymphadenitis and the season of the year. Thirty patients had had one or more similar attacks of definite abdominal pain previous to the one for which they were operated on; eleven had not had a previous attack of abdominal pain, and its occurrence or absence was not mentioned in the history of seventeen. The attacks were frequently accompanied by fever and/or vomiting. Definite abdominal tenderness was elicited in fifty-four of the fifty-eight patients. Spasm or rigidity was present in the right iliac region of twenty-seven patients. The blood counts were not remarkable; usually a moderate leukocytosis and polynucleosis were present. There was one death, a boy 8½ years of age dying of bronchopneumonia three days postoperatively. Every other patient recovered after an uneventful convalescence. At operation an excess of free turbid, straw-colored or serosanguineous peritoneal fluid was found in twenty-two cases. No growth was obtained in the five cases in which this fluid was cultured. The appendix was either grossly normal, thickened or slightly or moderately injected but never acutely inflamed. Evidence of previous infection was shown by definite appendicular adhesions in twenty-three cases. The pathologic diagnoses made after microscopic examination of the appendix were chronic productive appendicitis, chronic catarrhal appendicitis, lymphoid hyperplasia of the appendix, chronic recurrent appendicitis and a few instances of acute and chronic catarrhal appendicitis. At operation the condition of the mesenteric nodes conformed in every case to the classic picture of acute nonsuppurative mesenteric lymphadenitis. Appendectomy was performed in every case.

Twenty patients were examined from one month to six years and seven months after operation. Eleven of the twenty patients have had one or more attacks of abdominal pain similar in nature but not in severity to the one for which operation was performed. The attacks did not incapacitate the patient nor did their severity cause him to seek medical aid. The authors believe that they tend to abate and disappear in the course of the years and therefore advise operation not merely for diagnosis but also for appendectomy, as they share the general opinion that in some still unexplained way the removal of the appendix favorably affects the course of the disease. None of the numerous etiologic theories advanced for mesenteric lymphadenitis have been adequately proved. The presence of adhesions of the appendix would seem to be a more definite criterion of appendical involvement than microscopic alterations alone, since adhesions of this organ certainly indicate the occurrence of previous disease. The authors believe that mesenteric lymphadenitis is even more common than heretofore supposed; it is without doubt frequently overlooked at operations performed as a result of the unavoidably incorrect diagnosis of acute appendicitis. The clinical picture, which mimics acute appendicitis so closely that laparotomy is performed in children, adolescents and young adults, is frequently caused by an overlooked mesenteric lymphadenitis. Definite though slight pathologic alterations in the appendix are generally found in this syndrome. If at appendectomy the condition of the appendix does not fully and adequately explain the clinical picture, careful exploration for mesenteric lymphadenitis should be performed. Frequently the surgeon will be rewarded by finding a mass of inflamed nodes as the true cause of the symptoms and signs.

Chorionic Gonadotropin and Testosterone Propionate for Cryptorchism.—Zelson and Steinitz gave male and female hormone preparations concurrently to seventeen boys with cryptorchism. The ages of the boys ranged between 7½ and 12½ years and all of them had been seen previously at intervals for several months. Two of the boys had bilateral cryptorchism. Treatment consisted of three weekly intramuscular injections of chorionic gonadotropin and testosterone propionate. Four boys were given 500 units of chorionic gonadotropin and 5 mg. of testosterone propionate and thirteen 500 units of chorionic gonadotropin and 10 mg. of testosterone propionate. Treatment extended over a period of from three to twelve weeks. Complete descent occurred in nine (53 per cent). Four of these had been treated previously without satisfactory results. There was no effect on the cryptorchism in the other eight children. In all but three the penis and scrotum became larger. Growth of pubic hair occurred in eight, in three an inguinal hernia became evident, the undescended testicle became smaller in three and in one bilateral case both testicles descended and grew larger. The authors believe that treatment should be instituted before 10 years of age, as too long a delay in the descent may prevent the normal development of the testicle. In consideration of the expense and in order to avoid any unnecessary premature sexual stimulation they suggest that first a course of treatment with chorionic gonadotropin be given, from 300 to 500 rat units three times a week up to a total of 10,000 units, and if no response results a combined course of treatment should then be given after a rest period of from one to three months. If still no satisfactory result is obtained the cryptorchism should be treated surgically.

Diagnosis of Idiopathic Epilepsy.—DeLorenzo employed the antidiuretic and superhydration test introduced by McQuarrie as a diagnostic test in seventeen cases of convulsions. The procedure is as follows: 1. A diet of 40 per cent cream and dextrose in antiketogenic proportions is given every six hours. 2. From 2 to 5 cc. of water per kilogram of body weight and an amount of pitressin sufficient to prevent diuresis are given at intervals of three to four hours. 3. The patient is weighed every six hours after the bladder is emptied and before food or water is taken. 4. A complete record is kept on a chart of the food, water and pitressin given, and of the weight and urine. 5. A preliminary period of dehydration facilitates the occurrence of seizures. 6. The procedure is stopped when convulsions, symptoms of water intoxication (abdominal cramps, excessive vomiting and headache) or symptoms of pitressin toxicity occur or when it is evident that convulsions will not occur. All the

requirements of the test must be fulfilled and kept under strict surveillance to prevent mistakes and frequent failure. Two of the seventeen patients with convulsions had lead encephalopathy, one had convulsions following head trauma, three were less than 3 years of age, one had convulsions associated with an infection and pyrexia, one was a case of petit mal and the others had been diagnosed as idiopathic epilepsy. With the exception of two patients, all of the patients with a diagnosis of idiopathic epilepsy reacted positively to the McQuarrie test. Encephalograms done subsequent to the positive tests were negative. Of the two failures one was of a patient with hypoglycemia and in one the pitressin did not have the usual antidiuretic effect. The test was repeated a month later for the last patient and proved positive. Seventeen normal children who served as controls reacted negatively to the McQuarrie test. The child whose convulsions seemed to be precipitated by head trauma gave a negative reaction to the test; subsequently an encephalogram indicated enlargement of the left ventricle. The other patients with convulsions and the patient with petit mal reacted negatively to the test. It is difficult to determine the true significance of the test from such a small group of patients, but the authors feel that there is sufficient evidence to employ it as an aid in differentiating idiopathic epilepsy from other conditions simulating it. Negative tests will often lead to further investigation and the discovery of an entity which may be treated satisfactorily. They suggest that in idiopathic epilepsy there may be a disturbance in the normal physiologic mechanism in the cortical cell membranes and that any anatomic pathologic change found in these cases may have been the result, rather than the cause, of the disease.

Medical Annals of District of Columbia, Washington 9:291-332 (Sept.) 1940

- *Treatment of Delirium Tremens and Acute Alcoholic Hallucinoses. I. J. Silverman, Washington.—p. 291.
History of Tobacco. H. G. Hadley, Washington.—p. 298.
Fads and Fallacies in Diagnosis and Treatment of Hypertension. W. M. Yater, Washington.—p. 300.
Venous Ligation in Treatment of Superficial Thrombophlebitis: Report of Case. R. K. Hollingsworth, Washington.—p. 304.
Staphylococcal Septicemia Treated with Staphylococcus Antitoxin: Report of Case. W. W. Sager, O. B. Hunter and G. Tolstoi, Washington.—p. 306.

Treatment of Delirium Tremens and Acute Alcoholic Hallucinoses.—Silverman states that after Feb. 8, 1939, the treatment for alcoholic hallucinoses at the Gallinger Municipal Hospital has been to give hypertonic sodium chloride solution intravenously. Injections of 100 cc. of a 5 per cent solution and later 150 cc. were given twice a day, with sometimes an initial dose of 200 or 250 cc. There were no deaths in 1939 among the uncomplicated cases in which the treatment was given for at least two consecutive days. As a minimal standard for the present it is suggested that when a patient does not live for forty-eight hours the treatment has not been put into proper effect. The complicated cases showed a definite diminution of mortality. There were only four deaths among uncomplicated cases in 1939 after February 8 and in none of these was the treatment given, for one reason or another. There were sixteen deaths among the complicated cases. In the first six months of 1940 one patient died in whom a complication was not definitely established. This patient was in the hospital less than forty-eight hours and had insufficient saline solution. During this six months 327 patients were given the saline treatment. The effect of the hypertonic saline solution treatment is striking in that patients soon become quiet and the period of noisy delirium is usually cut down to an hour or at the most a few hours. It appears that instances of delirium tremens have been prevented and others aborted. The patients first become quiet, then coherent and rational, often losing their hallucinations on the first or second day. If pyrexia has ensued, more rigorous treatment must be pursued. When patients are physically fit they are often sent to the hydrotherapy department for hot cabinets and the Scotch douche to complete the treatment. Vitamins are used sometimes. The specific treatment does not exclude other therapeutic measures. The technic of the intravenous medication is simple. If accidental leakage should occur at the site of injection, no harmful results accrue. Local swelling due to the attraction of fluid from surrounding parts and the initial stinging subsides as the fluid accumulates. No sloughing of

tissue has occurred and venous thrombosis rarely, causing less trouble than with 50 per cent dextrose. There were only two reactions such as occur after parenteral isotonic saline or dextrose solution among the 5,000 or 6,000 injections. The rate of flow is best controlled by the height of the cylinder rather than by the clamp. Using a 20 gage needle, it usually takes from ten or fifteen minutes for 150 cc. of the solution. The apparatus should be watched throughout the injection as the needle may shift, especially if there has been some leakage with its consequent swelling and distortion of tissues. Alcoholic psychosis is frequently complicated by other conditions and such patients should not be denied the benefits of hypertonic saline solution together with such treatment as is indicated for the complication. The sodium chloride treatment decreases the incidence of lobar pneumonia and the chances of patients with complications are improved. Spinal puncture is unnecessary, sometimes harmful and at times dangerous.

Medicine, Baltimore

19:329-440 (Sept.) 1940

Plasma Prothrombin: Vitamin K. K. M. Brinkhous, Iowa City.—p. 329.

Rheumatic Heart Disease: Pathogenesis and Etiology in Their Relation to Therapy and Prophylaxis. H. F. Swift, New York.—p. 417.

New England Journal of Medicine, Boston

223:439-480 (Sept. 19) 1940

Clinical Manifestations of Primary Syphilis. F. M. Thurmon, Boston.—p. 439.

Interpretation and Reliability of Reports of Serologic Tests for Syphilis. T. B. Mallory, Boston.—p. 441.

Detection and Treatment of Cardiovascular Syphilis. H. L. Blumgart, Boston.—p. 443.

Early Clinical and Laboratory Manifestations of Syphilis of Central Nervous System. H. H. Merritt, Boston.—p. 446.

Public Health Aspects of Syphilis as It Concerns the General Practitioner. T. Parran, Washington, D. C.—p. 450.

Nonsurgical Conditions Simulating Acute Appendicitis in Children. H. L. Heyl, Boston.—p. 454.

Cancer. G. W. Taylor, Boston.—p. 461.

New York State Journal of Medicine, New York

40:1347-1418 (Sept. 15) 1940

Observations on Prolonged Human Refrigeration. T. Fay, Philadelphia.—p. 1351.

Refrigeration in Cancer: Pathologic Observations in 100 Advanced Cases. L. W. Smith, Philadelphia.—p. 1355.

Syphilis in Industry. E. D. Osborne, H. L. Traenkle and F. A. Dolce, Buffalo.—p. 1362.

Outbreak of Typhoid Fever Associated with a Trailer Camp. P. A. Lembecke, Rochester, and P. J. Raffie, Syracuse.—p. 1371.

Incipient Psychoses and the General Practitioner. B. Liber, New York.—p. 1375.

The Premature Infant: Statistical Study. M. B. Einhorn, Albany.—p. 1380.

Texas State Journal of Medicine, Fort Worth

36:343-400 (Sept.) 1940

Infectious Mononucleosis. R. R. Kracke, Emory University, Ga.—p. 348.

Treatment of Pneumonia with Sulfanilamide, Sulfapyridine and Its Allied Compounds. W. G. Reddick, Dallas.—p. 354.

Hemochromatosis: Report of Six Cases. J. C. Cain, Galveston.—p. 356.

Management of Premature Infants. G. T. O'Byrne, Corpus Christi.—p. 363.

Occult Syphilis. W. A. Clark and D. T. Gandy, Houston.—p. 367.

Selective Treatment of Cancer of Larynx. J. H. Foster, Houston.—p. 370.

Evaluation of Parenteral Fluid Therapy. J. W. Tottenham, Fort Worth.—p. 373.

The Climatetric. J. H. McLean, Fort Worth.—p. 377.

Endocrines in Gynecology and Obstetrics, with Special Reference to Stilbestrol in Treatment of Uterine Bleeding: Original Research on Menstruation. K. J. Karnaky, Houston.—p. 379.

Evaluation of Iodized Oil as Therapeutic Agent in Treatment of Bronchial Asthma. G. J. Seibold, Wichita Falls.—p. 386.

Hemochromatosis.—Cain reports six cases of hemochromatosis encountered at postmortem examination in the pathology department of the University of Texas. None were diagnosed before death. The oldest case dates back to August 1917. Hemochromatosis was a contributing factor and not the cause of death. The onset of the symptoms was slow in five of the six cases. Diabetes was present in only two. Polyuria was present in these and also in one other case, suggesting an early subclinical diabetes. Abdominal symptoms were present in all except one. They probably resulted from the terminal con-

ditions rather than from the hemochromatosis and therefore were of little value. The histories of two patients showed an excessive use of alcohol and a moderate, and possibly an excessive, use by two others. Five of the six patients definitely mentioned weakness as a predominant symptom. The weakness was progressive and could not be attributed entirely to the terminal disease. Splenic enlargement was present in three and definite cirrhosis of the liver in five. Only one patient showed gonadal hypoplasia and four made no mention of the genitalia or of impotence. The testicles of one patient were grossly normal. The heart was enlarged in four, and a generalized lymphadenopathy was present in three and marked jaundice in three. Pigmentation of the skin is one of the characteristic signs of hemochromatosis and it usually attracts attention first. Unfortunately, pigmentation may be completely absent. Two of the author's patients showed pigmentation, it was absent in two, both of whom were Negroes, and no mention of the skin of two was made. No microscopic sections were made of the skin in any of the cases. Although one of the Negroes showed no abnormal pigmentation of the skin, there were pigmented areas in the mucosa of the gums and palate. The ages of the patients at death were respectively 75, 52, 48, 50, 73 and 39 years. The death of the 39 year old patient was untimely. It was due to traumatic rupture of the urinary bladder. All the patients were men. Five of them lived for less than eleven months after the onset of symptoms. The other patient lived for nine years. One patient died of pernicious anemia, two of carcinoma of the prostate, one of arteriosclerotic heart disease and one of a terminal *Staphylococcus albus* septicemia complicating a severe diabetes mellitus. Grossly the skin may vary from the slate gray color of argyria to that seen in Addison's disease. It usually has a definite bronzed appearance. Microscopically there are deposits of hemosiderin in the corium and melanin deposits in the stratum malpighii. Microscopically the changes in the liver are those of cirrhosis and pigmentation. Iron stains show enormous amounts of hemosiderin in the hepatic cells. The pigment usually destroys the cell, and fibrous tissue replaces it. Hemofuscin is also present, but it is deposited chiefly about the adventitial coat of the blood vessels. The microscopic appearance of the pancreas, which was involved in five cases, is much like that of the liver. The appearance of the diabetes mellitus depends on destruction of the islet cells, which may occur early or late. Deposits of hemosiderin and hemofuscin were present in all six spleens. Iron stains showed most of the hemosiderin to be deposited about the trabeculae and the blood vessels. There was some increase in the fibrous tissue. Of the lymph nodes the portal and pancreatic are most commonly involved but none are immune. Iron stains show hemosiderin in large amounts, which crowds out the normal structures and causes necrosis and atrophy with replacement fibrosis. The adrenals were involved in four cases, showing deposits of hemosiderin in the zona glomerulosa with little excess of fibrous tissue. Any organ in the body may be involved.

Virginia Medical Monthly, Richmond

67:593-654 (Oct.) 1940

Psychiatry and the Courts: Some Attitudes and Their Reasons. W. Overholser, Washington, D. C.—p. 593.

Lobar Pneumonia Among the Mentally Ill. L. Kolipinski, Petersburg.—p. 599.

Mental Hygiene. H. C. Henry, Richmond.—p. 600.

Experiences with Insulin and Metrazol in Treatment of Eighty Psychotic Patients. J. C. Palmer and J. P. King, Radford.—p. 603.

Some Comments on Intramural and Extramural Activities of a Modern State Hospital. J. E. Barrett, Marion.—p. 605.

Mental Hygiene and Psychiatry. P. H. Drewry Jr., Richmond.—p. 609.

The First 100 New Admissions to the Petersburg State Colony. D. L. Harrell Jr., Petersburg.—p. 613.

Acute Surgical Lesions of Abdomen. I. Abell, Louisville, Ky.—p. 615.

Management of Urinary Infections in Children. R. M. Tyson, Philadelphia.—p. 623.

Endocrinology Briefs: Conclusion: Miscellaneous Glands. J. P. Lynch, Richmond.—p. 629.

Acute Traumatic Arterial Thrombosis of Extremities. E. L. Lowenberg, Norfolk.—p. 630.

Vinethene. W. M. Whitehead and C. C. Carter, Juneau, Alaska.—p. 635.

Low Back Pain. H. W. Kinderman, Palmer.—p. 637.

Anesthesia as Used in the Small Hospital. J. T. Rountree and Nora Whitever, Woodstock.—p. 638.

Bilateral Dermoid Cysts Complicating Normal Pregnancy: Case Report. W. R. Southward Jr., Richmond.—p. 641.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

Archives of Disease in Childhood, London

15:129-200 (Sept.) 1940

- Generalized Angiomatosis Presenting Clinical Characteristics of Storage Reticulosis, with Some Observations on Reticulo-Endothelioses. L. G. Parsons and J. H. Ebbs.—p. 129.
Sternal Marrow Puncture in Children. M. Diwany.—p. 159.
Simple Specific Precipitation Test for Cow's Milk. A. Gnosspelius.—p. 171.
Rheumatic Heart Disease in Identical Twins. C. B. Perry.—p. 177.
Incidence of Four Main Blood Groups in Rheumatic Heart Disease. G. R. Moxted.—p. 181.
*Carbohydrate Tolerance in Hypothyroidism and Hyperthyroidism. T. Crawford.—p. 184.

Carbohydrate Tolerance in Hypothyroidism and Hyperthyroidism.—Crawford tried to determine the changes of carbohydrate tolerance of six hypothyroid and two hyperthyroid children and to explain the manner in which these changes are produced. Children are suitable subjects for such a study, as their lesions usually occur in a pure form so that the metabolic disturbances can be assumed to depend on the altered state of the thyroid secretion. In adult myxedematous subjects conflicting factors (arteriosclerosis and postmenopausal polyglandular disturbances) are frequently present and tend to distort the results of metabolic tests and render their interpretation more difficult. Two tests have been employed to gage carbohydrate tolerance: the oral dextrose tolerance test and the intravenous dextrose tolerance test. In cretinism the fasting blood sugar level was frequently subnormal and tended to rise under treatment with thyroid preparations. Results of the oral dextrose tests were irregular. Low curves were frequent, but normal and high curves also occurred. Intravenous dextrose tolerance tests revealed impairment of dextrose tolerance. This is in contrast to the usual assertion that tolerance to carbohydrate is increased in hypothyroidism. Under treatment all the curves tended to approach normal; but if excessive dosage of thyroid was given impairment of tolerance reappeared in the form of high oral and delayed intravenous curves. Of the two cases of hyperthyroidism studied one showed a high oral curve with glycosuria and the other had an oral curve within normal limits. Both exhibited impaired tolerance to intravenous dextrose. The author concludes that the impaired carbohydrate tolerance in hypothyroidism is due to a general slowing of the processes of catabolism and possibly to a diminution in the storage rate of carbohydrate. The low oral blood sugar curve is due to slow absorption of the carbohydrate from the intestine. The impaired carbohydrate tolerance of hyperthyroidism is traceable to defective glycogen formation. This probably results from the excessive secretion of thyroxine causing an increased liberation of epinephrine, which in its turn mobilizes hepatic glycogen and inhibits its reformation.

British Journal of Radiology, London

13:293-324 (Sept.) 1940

- Supplementary X-Ray Treatment for Carcinoma of Cervix Uteri in Relation to Direction of Spread of Disease. A. G. C. Taylor.—p. 293.
Dose Measurement in Interstitial Radium Therapy. A. A. D. La Touche and F. W. Spiers.—p. 314.
Percentage Depth Doses in Low Voltage X-Ray Therapy. W. J. Meredith.—p. 320.
Nomogram for Determination of Lead Protection Against High Voltage X-Rays. W. Binks.—p. 322.

Indian Medical Gazette, Calcutta

75:385-448 (July) 1940

- Observations on Some Unusual Toxic Effects of Sulfanilamide Therapy. M. N. De and N. R. Konar.—p. 385.
Treatment of Opium Addiction with Lecithin and Glucose and Its Effects on Abstinence Symptoms. R. N. Chopra and G. S. Chopra.—p. 388.
Radiologic Appearances of Heart and Lungs in Cases of Hypertensive Heart Failure. R. J. Vakil.—p. 392.
Nonepidemic Typhus Fever in the Civil Population of Bangalore (Civil and Military Station). L. R. Sharma.—p. 398.
Common Cold Responsible for Grave Suspicion of Rabies in Dog and Discussion on Associated Considerations Including Rabies in Mongooses and Bats. S. D. S. Greval and M. J. Nicholas.—p. 401.
Hormones in Menstruation and Pregnancy: Physiology, Pathology and Treatment: Résumé. A. P. Pillay.—p. 404.

Journal of Physiology, Cambridge

98:389-502 (Sept.) 1940. Partial Index

- Weight of Chromophore Carrier in Visual Purple Molecule. E. E. Broda, C. F. Goodeve and R. J. Lythgoe.—p. 397.
Action of Antidiuretic Principle of Posterior Pituitary Extracts on Urine Excretion of Anesthetized Animals. H. Heller.—p. 405.
Pituitary and Insulin Content of Pancreas. R. E. Haist.—p. 419.
Action of Some Amines Related to Adrenalin: Phenylallylamine, Phenylbutenylamine, Diphenylethylamine. J. A. Gunn and M. R. Gurd.—p. 424.
Relation of Heart Rate to Intracranial Pressure. O. G. Edholm.—p. 442.
Observations on Osmotic Pressure of Endolymph. P. Aldred, C. S. Hallpike and A. Ledoux.—p. 446.
Slow Vaginal Potentials. R. B. Bourdillon and O. M. Lidwell.—p. 480.
Action of Adrenalin on Uterus of Guinea Pig and Its Modification by Eserine. W. T. Agar.—p. 492.

Lancet, London

2:317-350 (Sept. 14) 1940

- *Glossitis and Vitamin B₂ Complex in Pellagra, Sprue and Allied States. P. Manson-Bahr.—p. 317.
Lung Abscess Treated with Sulfanilamide. G. F. Taylor, M. Yusuf and N. L. Chitkara.—p. 320.
Postpartum Necrosis of Anterior Lobe of Pituitary. H. L. Sheehan.—p. 321.
Vertebral Injuries in Convulsion Therapy and Epilepsy. D. Blair.—p. 325.
Idiopathic Myalgia Simulating Visceral and Other Diseases. M. Gutstein-Good.—p. 326.
*Psychiatric Complications of Hypoglycemia in Children. E. W. Anderson.—p. 329.

2:351-380 (Sept. 21) 1940

- *Treatment of War Wounds of Limbs: Experience in 266 Cases. S. M. Cohen and C. A. R. Schultenburg.—p. 351.
*Glossitis and Vitamin B₂ Complex in Pellagra, Sprue and Allied States. P. Manson-Bahr.—p. 356.
Mechanism of Cerebral Concussion. K. C. Dixon.—p. 360.
Intravenous Insulin in Treatment of Schizophrenia. M. Jones.—p. 361.

Glossitis and Vitamin B₂ Complex in Pellagra, Sprue and Allied States.—Manson-Bahr thinks that the aphorism "raw red tongue, raw red gut" may contain more than a grain of truth; the tongue may be regarded as a mirror of the stomach and intestine. Sprue tongue is well known, and a similar condition is seen in pellagra, pernicious anemia and idiopathic steatorrhea, which are characterized by anemia and intestinal upset. Known etiologic factors in this group of diseases include nicotinic acid and riboflavin deficiency. This paper is based on clinical observations made with the object of disentangling the etiology of tropical sprue and allied diseases. In the present state of knowledge it is impossible to envisage the exact manner in which these various syndromes are related, but it is clear that there exists some common link or chain connecting them. It has been shown that glossitis, probably of a similar nature and nonspecific to the disease, is found in pellagra, sprue, pernicious anemia, the nutritional anemias and idiopathic steatorrhea and that through this and other features, such as changes in the spinal cord, these diseases are closely related to one another. It is therefore suggested, on analogic as well as therapeutic grounds, that a deficiency of the vitamin B₂ complex, which appears to be common to all, may partially explain these phenomena. It is further suggested that nicotinic acid and riboflavin play an important part in the treatment of sprue as well as of pellagra, pernicious anemia, subacute combined degeneration of the cord and, to some extent, of idiopathic steatorrhea. It is further shown that these diseases are so closely related to one another that borderline cases are often encountered embodying the salient features of two or even more of the group. The opinion is therefore expressed that this group of diseases has as many affinities in common as there are factors involved (some of which may still be obscure) and that the clinical picture of any one of them varies with the presence or absence of any one or more of these factors.

Psychiatric Complications of Hypoglycemia in Children.—Anderson points out that hypoglycemia, whether from overdosage of insulin or from hyperplasia or neoplasm of the islets of Langerhans, or from any other cause, shows itself most in symptoms referable to the nervous system. Baker in 1939 described a prodromal stage of nervousness, sweating, pallor, tremor, sleepiness and salivation, which may pass on to diplopia, muscular twitches of the face and limbs, hemiplegia and jacksonian or epileptiform attacks. Other disturbances

include aphasia, disorders of sensation, hemianopia or complete blindness, auditory changes and incoordination. Finally the patient may become stuporous, with various reflex changes. Psychic disturbances sometimes accompanying the neurologic signs may begin as fears, anxieties, mild depression and faulty concentration and pass on to a stage in which the speech is thick, the patient grimaces and laughs or cries without reason and is dull or garrulous, and fugues and hallucinations may result. He may finally lose consciousness and, when he recovers, have no memory of the attack. Other authors describe a wide range of disturbances, including a fall of tension in the eye-balls, akinesia and masklike stiffness of the face, hypothermia, migraine, irritability, megaphony, behavior disorders, such as stealing, personality changes, with euphoric indifference and docility, mild depression, severe agitation and catatonia with grandiose delusions, besides psychoneurotic pictures. The association of epileptiform convulsions with hypoglycemia, especially in children, has often been noted, but the available evidence shows that the relationship between them is not constant. The author reports the histories of two children with hypoglycemia who developed neuropsychiatric symptoms. In the first one the hypoglycemic coma, which developed after an excessive dose of insulin, lasted four days and the patient then showed gross generalized dementia with symptoms suggesting an extensive lesion of the left side of the brain. After fifteen months there was only partial recovery of function. The second patient was a diabetic boy who had always been sensitive to insulin. He showed a behavior disorder, which was most manifest when the blood sugar was low. While in a hypoglycemic phase he stabbed another child. After treatment he improved considerably in both intelligence and behavior. The author discusses the difficulties encountered in the treatment of diabetic children and calls attention to the possible dangers from the newer forms of insulin.

Treatment of War Wounds of Limbs.—Cohen and Schulenburg report observations on 266 cases of gunshot wounds of the extremities. Since even small bomb splinters were often found to have produced severe internal destruction of the tissues, the authors always employed general anesthesia. The routine use of evipal and pentothal sodium followed by gas and oxygen was most satisfactory. The skin surrounding the wound was cleansed with ether soap, shaved and washed with saline solution, the wound in the meantime being covered with a saline swab. Except for excision of the skin edge no extensive débridement was carried out, but the wound was laid widely open by means of several radiating incisions. No attempt was made to excise or trim muscles. In packing, care was taken that there should be uninterrupted drainage from the cellular spaces between the muscle bellies. Tendons were not sutured, but their frayed ends were removed. Bone fragments were removed only when completely detached. No suturing or trimming of divided nerves was done. The operation was always preceded by x-ray examination. Foreign bodies were removed only when readily accessible. Large splinters were always removed but not the small ones lying some distance from the entry wound. In a few cases, localized abscess formation around a foreign body subsequently necessitated incision. Petrolatum gauze was used for packing. A thin layer of sterilized plaster wool was placed over the wound; the rest of the plaster was skin tight. Altogether eighty-four cases due to gunshot wounds were treated in plaster. Of these, fifty-four cases were compound fractures, thirty-six being of the upper extremity and eighteen of the lower. All compound fractures were treated in closed plasters. Reduction was obtained only by manual traction and maintained while the plaster was being applied. There were 207 wounds involving only the soft tissues, of which thirty were treated in plaster. These thirty were extensive wounds of the limbs, and the same principles were applied as if an associated fracture had been present. All patients operated on received a course of chemotherapy. An initial dose of three tablets of sulfanilamide was followed by two tablets every four hours for forty-eight hours, and then one tablet every four hours for forty-eight hours, making a total dosage of 19.5 Gm. in four days. The nursing staff was told that no dose was to be omitted, even at night. No toxic effects were observed from this dosage. There were no deaths, only one limb was amputated, healing

has been rapid and uneventful, and after ten weeks the general condition of all patients is excellent. The value of the closed plaster method both for fractures and for injuries of the soft tissues is thus confirmed.

Medical Journal of Australia, Sydney

2:209-228 (Sept. 7) 1940

The Citadel. C. H. Fitts.—p. 211.

Value of Preoperative Estimations of Serum Protein Concentration in Gastric Surgery. J. Devine.—p. 214.

Helvetica Medica Acta, Basel

7:115-224 (Aug.) 1940

*Acute Necrosis of Pancreas and Its Treatment. R. Weyeneth and F. Wassmer.—p. 115.

*Aspects of Bronchial Carcinoma. A. Weigl.—p. 142.

Influence of Vitamin C on Labor Pains. W. Käppeli.—p. 169.

Electrocoagulation of Chronic Metritis of Neck of Uterus. T. Marti.—p. 197.

Acute Necrosis of Pancreas.—Weyeneth and Wassmer suggest that pancreatitis should be considered in the presence of an acute abdominal syndrome if the history reveals an old or recent disorder of the hepatobiliary or gastroduodenal tracts, and particularly if the patient is obese or addicted to alcohol. The face of the patient with pancreatitis is generally pale or somewhat cyanotic. If the biliary passages are involved, the appearance is subicteric. The patient sweats profusely and complains of vertigo and of trembling of the fingers. Vomiting is frequent, at first of food and later of bile. The abdomen often shows supra-umbilical distention. The pain is localized in the left half of the epigastrium and is extremely violent. Although of considerable diagnostic significance, the symptom pain is not sufficient to establish the diagnosis. Modern laboratory methods are absolutely essential. Examination of the feces permits evaluation of the external secretory function of the pancreas, steatorrhea indicating insufficiency. The detection of deviation of the pancreatic ferments is of primary importance. Wohlgemuth's method is used for the determination of the diastase content of the urine. The authors prefer Baltzer's microdetermination for the examination of the blood serum, the modification of Wohlgemuth's method (for blood instead of urine) not being sufficiently precise. The authors regard acute pancreatic necrosis as a manifestation of autodigestion initiated by the activation of trypsin and manifested by necrosis and hemorrhage, while the lipase subsequently produces fat necrosis. The frequency of this pancreatic disorder in the presence of lithiasis indicates the important rôle of bile in the development of pancreatitis. The histories of twenty-six cases observed at the surgical clinic of Geneva are presented. Five of the patients were treated conservatively and have improved. Of the twenty subjected to surgical treatment, seventeen died. They were operated on during the acute phase. The three patients who survived the operation had been operated on about two weeks after the onset. The authors are convinced that the operation, instead of exerting a favorable influence on the condition, leads to toxic shock. The treatment employed with success in five of the cases was as follows: 1. Strict abstinence from food and liquids. 2. Restriction of chlorides for forty-eight hours; this is done despite the hypochloremia in order to diminish the pancreatic edema. 3. Daily administration of from 1 to 2 liters of a 10 per cent solution of dextrose by intravenous infusion and from 15 to 30 units of insulin. 4. Large doses of atropine to diminish the pancreatic secretion. 5. Relief of the intestine by repeated enemas, eventually with a 1 per cent solution of quinine. 6. Ice bag to the epigastric region and morphine. After the acute phase has passed (in four or six days), fruit juices and carbohydrates can be given. Later the biliary passages can be examined and if necessary, an operation on the biliary tract may be performed in order to prevent recurrences.

Bronchial Carcinoma.—Weigl discusses the present status of bronchial carcinoma and presents observations on thirty-three cases observed in his clinic. The fact that thirty of these were in men proves again the high incidence in men. The author cites evidence indicating that, besides hereditary factors, certain industrial hazards (work in dye factories or exposure to silica dust) and smoking play a part in the etiology. In his own

cases no connection could be established between the bronchial carcinoma and occupation. The majority were in the fifth or sixth decade of life. Thirty-three per cent of the patients had a family history of carcinoma and 50 per cent had had pulmonary or pleural disorders such as pneumonia, exudative pleurisy, influenza, chronic smokers' bronchitis and apical tuberculosis. A considerable number presented thoracic or spinal anomalies. The onset was insidious in 70 per cent and acute in 30. In cases in which the onset was insidious the complaints were nearly always the same and quite characteristic. There was an increasing, irritative cough; the sputum was at first mucopurulent and later tinged with blood. Raspberry jelly sputum was rarely encountered. In approximately 75 per cent increased temperatures caused by stagnation bronchitis and bronchopneumonic attacks were observed for long periods. Many did not ask medical aid until severe symptoms such as hemoptysis, dyspnea and increasing hoarseness appeared and the carcinoma was already in an advanced stage. In these cases cachexia was generally present. The muscular tonus and cutaneous turgor were greatly reduced. Some patients had a grayish pallor, others presented subicterus or cyanosis. A pulmonary process was indicated by severe dyspnea, retraction of the thorax and lag of the involved side in respiration. Cardiac involvement was often observed, usually in the form of hypertrophy and dilatation of the right chambers. Metastases were demonstrable in about 50 per cent. The localization of the tumor was rarely possible by physical methods. X-ray examination assumes a decisive role in the diagnosis. The following roentgenologic appearances were observed: partial atelectasis, hilus tumor, greatly increased density of the hilus, solitary tumor shadows usually with mantle pneumonia, effusion and seropneumothorax. Secondary roentgenologic signs were elevation of the diaphragm on the side of the tumor, dislocation of the heart, trachea and mediastinum, sinus effusion, induration, hilar lymphoma and pulmonary shrinkage. Bronchography was performed in four cases, tomography proved valuable in three, and tracheobronchoscopy was done in seven. Exploratory excision made possible a correct histologic diagnosis in only one case. The sedimentation speed was nearly always increased. About 50 per cent of the patients had a mild leukocytosis. In seven of the patients the treatment consisted of Coutard's protracted fractional roentgen irradiation. The others were subjected to symptomatic treatment. The roentgen irradiation produced temporary improvement, reduction of pain and perhaps a slight prolongation of life. The average survival was less than a year. Treatment is generally unsuccessful. Some success is being reported with lobectomy or pneumectomy.

Acta Pædiatrica, Stockholm

27:403-516 (June 30) 1940

*Studies on Prognosis of Children Delivered by Cesarean Section. O. Brandberg.—p. 403.

Investigation of Ascorbic Acid Excretion in Urine of Healthy and Febrile Children. G. Görtz.—p. 429.

State of Nutrition of So-Called Underweight School Children. A. Ruotsalainen.—p. 437.

Follow-Up Examination of Children with Positive Tuberculin Reaction: Three Cases of Biologically Cured Tuberculosis Infection. P. Rosenberg.—p. 452.

*Albers-Schönberg's Disease (Marble Bones). S. van Creveld and N. I. Heybroek.—p. 462.

Postvaccinal Encephalitis in Child Formerly Suffering from Myasthenia Gravis Pseudoparalytica. L. Grönlund.—p. 495.

Hypophysial Nanism Resulting from Craniopharyngioma. E. Gjörup.—p. 508.

Prognosis for Children Delivered by Cesarean Section.

—The material studied by Brandberg includes children delivered by classic or by vaginal cesarean section during the years from 1918 to 1939. It includes 367 cases, 292 of classic cesarean section and seventy-five of vaginal cesarean section. The immediate mortality (born dead or dying within two hours after birth) amounted to 7.5 per cent in the case of classic cesarean section and 54.7 per cent in the case of vaginal section. The mortality between two hours and one month of life was 4.82 per cent for those delivered by the classic cesarean section and 23.5 per cent for those delivered by the vaginal cesarean section. The figure 4.82 per cent does not exceed the figure for the newborn in general. Among the prematurely delivered the mortality was 66% per cent; among the full-term

infants it was 9.31 per cent. As was to be expected, the mortality of the infants was low or practically zero in those cases in which the intervention was made to deliver a living child, because dystocia was foreseen (contracted pelvis, tumors or advanced age of a primipara); it was higher in the cases in which it was performed on account of danger to the life of the mother (hemorrhages of placenta praevia, premature detachment of the placenta, eclampsia and so on). Apnea and asphyxia are not unusually frequent in children delivered by cesarean section. Mental and neurologic defects were observed in 5 per cent of the reexamined children. However, not all of those defects could be traced to an obstetric trauma; in about half of these cases other causes must be assumed. The frequency of cerebral injuries traceable to a trauma intra partum is 1.76 per cent in the classic cesarean section and 12.5 per cent in vaginal cesarean section; however, the median error is so high that these figures are not reliable. The author is of the opinion that more cerebral injuries would be found if all infants who die shortly after delivery should be subjected to postmortem examination. This was not done in the material analyzed here.

Marble Bone Disease of Albers-Schönberg.—Van Creveld and Heybroek describe two cases of marble bone disease or of osteosclerosis fragilis generalisata. The first patient was a newborn baby who died on the ninth day of life; the second was a girl who had been blind from birth and in whom the disease was discovered at the age of 4½ years. Although the literature contains reports indicating that familial occurrence may be expected in about 40 per cent of the cases, it was not hereditary in either of the two children whose histories are reported here. The older child, however, had consanguineous parents and the newborn child had two siblings in whom Alban Köhler's disease was diagnosed. The older child showed a retardation in physical development, but the mental development was normal. Her head was enlarged, which is probably due to the thickening of the cranial bones as well as to a slight hydrocephalus. The bilateral atrophy of the optic nerve, which caused blindness, was the first manifestation of the disease. The child had been subject to repeated bone fractures even after slight trauma. The decrease in elasticity is regarded as the chief cause of this tendency to fractures. The thickening of the cortical and spongy tissue was not general in this patient, though in some typical places (skull, ribs, vertebrae and femurs) the osteosclerosis was so pronounced that macroscopic inspection disclosed no difference between the cortex and the spongiosa. The characteristic clubbing of the long bones was readily demonstrable. The presence of bands running parallel to the line of the epiphysis was noticeable especially in the bones of the hands and feet and in the metaphyses. In the scapulas, in both ossa ilii and in the tarsal and carpal bones these bands were ring shaped. The factors responsible for the formation of these bands are unknown, but it is suggested that their existence points to periodic fluctuations in the process of sclerosis. Symptoms indicating endocrine disturbances were absent in both children. Biochemical tests revealed no signs of hyperparathyroidism. The blood of both children had normal values for calcium, inorganic phosphorus and magnesium and in the older child the ultrafiltrable calcium and inorganic phosphorus were likewise normal. Both children had the normal number of units for (alkaline) phosphatase. The newborn child had an abnormal blood picture characterized by an extraordinary erythroblastemia, thrombopenia, increase in the staff cells, juvenile forms and myelocytes, also increase of the mean diameter of the erythrocytes. In the older child the blood picture has been normal up to now. This absence of anemia the authors regard as an argument in favor of the conception that the bone anomalies of marble bone disease are primary and not dependent on the damage of the bone marrow. The authors review various theories suggested to explain the osteosclerosis of marble bone disease. With regard to the diagnosis they stress the atrophy of the optic nerve, the tendency to bone fractures, the malformation of the thorax, the thickening of the lower end of the femurs, the peculiar shape of the head and more or less incomplete teeth. No effective therapy is

